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Fines Are Imposed on Waste Paper Dealers

Individuals and Concerns Who Pleaded Guilty of Violating OPA Maximum Price Regulation Fined $13,930 by Federal Judge—Illegal Sales Were Made During January, February and March, 1942.

Thirteen defendants, including six New York corporations and seven individuals who pleaded guilty to charges of violating Maximum Price Regulations of the Office of Price Administration in connection with the sale of waste paper were fined a total of $13,930 by Federal Judge Alfred C. Coxe in the United States District Court in Manhattan on Tuesday, December 8.

The informations to which the defendants pleaded guilty charged that they had purchased and sold waste paper above ceiling prices and had falsified their record to cover up these transactions.

The imposition of these fines, according to Francis Currie, New York District OPA Attorney, brought to a close "a wide-spread conspiracy which was aimed at deliberately violating ceiling prices in order to assure a supply of paper for certain mills at a time when paper was so scarce that the public was engaged in a vast salvage effort."

Defendents Subject to Fines

The defendants and the fines imposed upon them were as follows:

Benjamin Cohen, 295 Madison avenue, was fined $2,050. Joseph Gaccione was fined $400, and Gaccione Brothers & Co., Inc., 183 South street, $1,000. Fines of $100 and $1,000, respectively, were levied against Sylvester Barone and the Barone Paper Stock Company, Inc., 306 East 148th street, the Bronx. Williams-Bauer Corporation, 154 Nassau street, and Ralph Williams were fined $400 and $250, respectively. Conti-Williams, 42-16 Vernon boulevard, Long Island City, Queens, was fined $400. Penalties of $1,230 were set for I. Hershman Corporation, 16 East 34th street, and Morton and Alex Adelman. officers. The Norstrand Corporation 350 Madison avenue, and Leif Norstrand were fined $6,600 and $500, respectively.

OPA Discovered Conspiracy

The OPA uncovered the conspiracy following an investigation of complaints by Lester C. Dunigan. New York District OPA Enforcement Attorney; and Arthur G. Warner, Enforcement Attorney. The investigation of the waste paper industry is still under way by a staff of OPA investigators.

The defendants were arraigned in Federal Court on informations charging conspiracy and violation of the Maximum Price Regulations on November 27, at which time they pleaded not guilty. On December 4 the defendants entered pleas of guilty to the charges before Judge Coxe. after Assistant United States Attorney Samuel H. Reis had moved the cases for trial.

OPA Attorney Outlines Charges

Outlining the charges, Mr. Currie said: "The conspiracy was carefully planned so as to include falsification of books, payment of excess charges by cash instead of checks, false invoicing, forging of documents to 'prove' deliveries which were never made, and illegal brokerage charges.

"The conspiracy originated in a period of serious paper shortage, when school boys and housewives all over the country were collecting scrap paper so that packaging materials would be available for war supplies and other essential uses.

Illegal Sales Continued for Three Months

"The illegal sales were continued for a period of three months, during January, February and March of 1942 with over-ceiling prices paid both to paper stock dealers by brokers and to brokers by paper mills who processed the waste paper."

Riegel Co. Sends Service Men Check

The Riegel Paper Corporation employees now in military service have been sent checks of $25 as a Christmas present from their employers. A letter from John L. Riegel, president, accompanying the check, concluded with the statement:—"In the name of the employees of the company, may we send to you our very best wishes and our sincere regards for the service which you are rendering to our country."

This is but one of the several gifts this corporation and those of its employees "back home" have forwarded to the Riegel employees, who are in the armed forces, during the year.

Committee Discusses Newsprint Problem

Newspaper Advisory Group Meet With WPB But No Final Action on Changes in Supply of Newsprint to Publishers Is Taken — Formula For Curtailment Presented—Joint Statement is Issued.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 14, 1942 — The Newspaper Industry Advisory Committee met December 10 in Washington with WPB officials to discuss the supply and demand situation affecting newsprint paper. No final action was taken in connection with any possible changes in the supply available for use by newspapers. However, two steps were taken.

1. The Industry Advisory Committee adopted and submitted to the War Products Board the following formula which can be used as a basis for further study of the problems:

"The war requirements of the United States have created shortages of manpower, electric power and transportation affecting the supply of print paper and other critical materials required in the production of newspapers. Notwithstanding the essential character of the public services rendered by newspapers, especially in time of war and with full appreciation of their fundamental responsibility in a democratic community, it is considered necessary to reduce their consumption of critical materials.

"In order that such reduction may be equitably applied, the following order governing the use of print paper by newspapers is deemed necessary and appropriate in the public interest:

"Each individual newspaper (daily, seven-day or non-daily) may consume print paper in each quarter commencing January 1, 1943 in an amount based upon the total tonnage required to produce its 'net paid' circulation for the corresponding quarter of the year 1941.

"Inevitable loss in usable tonnage including wrappers, damage in transit, spoiled copies in printing, etc., in a total amount of 3% shall be allowed over and above the 'net paid' base tonnage.

"In order to reconcile the 1941 base to substantial circulation increases, the Director has authority to make adjustments to the said base.

"Should reductions from the aforesaid base be necessary in the public interest, they shall be applied by the Director General for Operations, War Production Board percentage-wise to the base as determined in Section 1.

Defines Print Paper

"Print paper shall mean any grade of paper used. The tonnage used in all ready print pages or supplements, including those printed or prepared by other than the distributing newspaper, shall be figured as part of the distributing newspaper's consumption in both the 1941 base periods and the corresponding quarters of 1943.

"Print paper as defined by this order shall be that used for the publication of said newspaper. All loans of print paper shall, within the period of 30 days, be reported to the Director."

After a discussion of this formula, it was also recommended by the Committee that this formula for possible restrictions, if adopted, not be applicable to the first 25 tons of print paper bought by any paper during a quarter, after the paper had complied with the provisions relating to the 1941 level. This would have the effect of not restricting consumption by small papers which, on the whole, use a relatively small amount of the total print paper supply.

It was also pointed out that the formula, if adopted, would affect American newspapers in varying degrees, so that it is impossible to give any flat percentage to which over-all print paper consumption would be cut.

2. The Industry Advisory Committee adopted a resolution along the following lines:

"Your Committee unanimously recommends to all newspapers that, for the purpose of meeting the shortage and possibly forestalling the development of further shortages, all possible economies in the use of print paper and other critical materials consistent with the least possible impairment of their public service be immediately instituted."

Issues Joint Statement

During the meeting the following joint statement was made by William G. Chandler, Director of the Printing and Publishing Division, and by Donald J. Sterling, Consultant to the Chairman of WPB, on the Newspaper and Publishing Industries:

"The sole purpose of our session today is to attempt a balance between present and prospective supply of print paper and other materials which we can use in the production of newspapers.

"It is our hope that you will understand the limits of our discussion. It is our understanding of the War Production Board that we may help industry in its sole purpose of maximum aid to the war effort with the minimum of injury, or even destruction, of private industry.

"You will understand, with all its implications, that the representatives of Government here present, and you, the representatives of an essential means of public information, are here so that we may completely submerge our individual interests.

"Restriction of volume of those products necessary to our continued service may or may not control prices of our necessary materials. It is with no idea or purpose of avoiding responsibility to you that we limit this discussion and War Production Board responsibility to available quantity and not to cost."

During the discussion, it was made clear that the War Production Board, in any program to be adopted, does not intend to adopt any regulations affecting the way in which publishers may use the quantities of newsprint which are available.

During the session, the publishers unanimously expressed their thanks to R. L. Weldon, Newsprint Administrator of Canada, and to H. E. Whitaker, Deputy Director of Pulp and Paper Division of

WPB, for the comprehensive information which they made available on the supply and demand situation in print paper.

Following the meeting, Mr. Chandler made the following statement to correct a misunderstanding arising out of reports concerning the availability of pulp-wood for the manufacture of print paper:

Supply Situation Misunderstood

"Misunderstandings were current in Washington today about the availability of print paper next year. The misunderstanding arose because of confusion between the availability of print paper and pulp wood supply.

"The facts on pulpwood supply are these: a preliminary and approximate estimate of the pulpwood supply available for 1943 indicates a supply of 20,000,000 cords in North America, including Canada. This compares with current consumption at the rate of 25,000,000 cords a year. This indicates a reduction of 5,000,000 cords in the North American supply.

"But the cut in availability of wood does not necessarily mean a proportionate cut immediately in the supply of print paper, because of the inventory situation today and other factors. It is impossible now to give a definite figure on print paper supply in 1943."

Higher Price Held Imminent

In commenting on the expected increase in the price of newsprint, the Newspaper Industry Advisory Committee was informed that an increase is "imminent," W. G. Chandler, Chief, Printing and Publishing Branch, War Production Board, said on December 11.

Mr. Chandler confirmed that such notice had been given, but stated he did not know how large an increase was in prospect, noting that the Office of Price Administration, not the WPB is in sole control of prices. OPA spokesmen who were available said they were unable to give any information on the matter.

Prices of standard newsprint have been unchanged since April 1, 1938, although Canadian newsprint mills posted an increase to $53 earlier in the year. The OPA issued a regulation in April making the $50 ceiling mandatory for United States purchasers, but announced at the time that this action "did not preclude further discussions" between the OPA and the Canadian Wartime Prices and Trade Board concerning the Canadian mills.

In a joint statement after the newspaper industry advisory committee meeting, Donald J. Sterling, consultant to Donald M. Nelson, WPB chairman, on newspapers and publishing, declared the session was devoted solely to supply problems and was in no way connected with cost.

"The prices which you (the newspapers) will pay for print paper, metals and chemicals necessary to your service to the public are not the responsibility of the WPB," the statement said. "Prices are the responsibility of the OPA."

Royal Paper Corp. Made Howard Agent

The Howard Paper Company announces that the Royal Paper Corporation, 210 Eleventh avenue, New York City, has been appointed an agent for Howard bond and Maxwell offset.

Canadian Producers Express Satisfaction

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 14, 1942—The news from Washington that a rise in the price of newsprint is "imminent"—a statement credited to W. G. Chandler, chief of the printing and publishing branch of the War Production Board—has been received with great satisfaction by newsprint manufacturers here, because it shows official recognition of the fact that the present price is quite out of line with costs, which have been steadily mounting in every direction—cost of labor, cost of materials, cost of power (due to the use of electricity for the secondary purpose of heating being cut off), and cost of transportation (due in large measure to restrictions in water transportation).

It will be remembered that the Canadian mills had announced an increase in the price of newsprint from $50 to $53 earlier in the year, but this had been disallowed temporarily by the OPA. What has brought the matter to an issue now is the proposal to effect a drastic curtailment in the production of newsprint in the interests of the war effort. Both newsprint manufacturers and publishers have expressed alarm over the alleged drastic character of the proposed cuts in newsprint production and consumption and conferences by the interested parties have been going on for weeks.

According to report here, the newsprint manufacturers have shown tremendous willingness to co-operate in reasonable curtailment of production on condition that a price readjustment be made, failing which they predicted another disaster for the industry. Publishers are naturally not so pleased at the prospect of a price increase, since they are faced, like many other businesses, with contracting revenues and increasing costs. They have also been quite alarmed at the suggested extent of proposed cuts in their use of newsprint.

If the news that a proposed increase in the price of newsprint proves to be true, then it means only one thing for them, namely, that the decision, when announced, will be accompanied by sharp limitations in the supply of newsprint, and equally sharp cutting down of the size of newspapers, with perhaps limitations in circulation—a prospect that cannot be faced with equanimity, especially in view of the inroads the radio is making on newspaper advertising revenue and newspaper circulation.

Paper Sales Up for October

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 16, 1942—Wholesalers' sales of paper and its products for the month of October, with 89 firms reporting, totaled $6,637,000 which is an 8 percent increase over the previous month, according to the Bureau of Census, Department of Commerce.

Year-to-date sales (including October) totaled $78,748,000 which is a 6 percent increase over the previous year.

Forty paper firms reported inventories at the end of October at $5,127,000; stock-sales ratios were 153 compared with 171 for September, and 116 for October of the previous year.

Accounts receivable as of October 1 were reported by 75 firms at $7,693,000; with collection percentages at 72, compared with 68 in September, and 70 for October, 1941.

War Needs May Further Curtail Newsprint

Conservation of Many Materials, Power, and Labor Likely to Necessitate More Drastic Restriction in Newsprint Production—Short Pulpwood Cut is Expected as More Lumber is Now Required.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 14, 1942—No comment was available here today concerning discussions held this week between Newsprint Administrator R. L. Weldon and representatives of Canadian publishers. The need for a further cut in the production of newsprint is said to be more or less imperative from the standpoint of the conservation of many materials used in the manufacture of this product as well as for the conservation of labor and electrical energy

Government agencies have intimated that they would prefer that newspaper publishers reach an agreement among themselves as to the best way the limited supply of newsprint paper can be distributed. Spokesmen for the pulp and paper industry persistently maintain that their operations are by no means non-essential, even in wartime. Newspapers, it is pointed out, are particularly valuable in wartime from the standpoint of the morale of the population. Moreover, the government is not likely to overlook the importance of the newsprint industry as a producer of needed foreign exchange. The maintenance of the press is important to the war effort of all the United Nations and that is only possible through an adequate supply of pulp and paper, it is argued.

Future Newsprint Production Uncertain

As the fourth quarter of 1942 nears its close, the newsprint industry finds itself still uncertain regarding what to expect during the next twelve months. It is an unusual situation for the industry. Supply and demand no longer govern operations. A number of factors must be taken into consideration in trying to estimate the available supplies of newsprint during the next year. They have all been prominently before mill executives for months, and all of them are still full of uncertainties. Some of these factors are manpower, electrical energy, pulpwood supplies, other essential materials used in the industry and the increasing use of pulp by war industries.

Some people are beginning to intimate that they think Canada has undertaken more than she can accomplish without serious dislocation of industry. With more than a half million men in uniform and the millions of dollars that have been spent in building new industries for war purposes, and many more just starting operations or nearing completion, concern is beginning to be felt in some quarters as to where all the manpower and womanpower is coming from to staff these enterprises To pulp and paper operators already hard pressed for workers, this can only mean further diversion of labor from them to the new plants. If the National Selective Service setup knows the answer to this problem, its spokesmen have made no clear-cut pronouncement on the matter.

Power and Labor Supply Situation Serious

A little closer figuring can be done regarding electrical power, yet there is no assurance that the 150,000 h. p. already diverted from the pulp and paper industry will be all that that industry will be called upon to supply. Perhaps the Power Controller knows how new electrical developments just coming into use will balance up with the new war industries. The peak load for lighting purposes has almost been reached without serious difficulty and after the new year begins things should be a little better in that respect.

Pulpwood contractors are still advertising for men to work in the woods and indications are that the cut will be short this season. Logging for lumber operations has priority over pulpwood cutting. There has been a steady increase in the use of pulp for war industries, in a great many forms. About 85% of the newsprint manufactured in Canada is made from groundwood pulp and although this has a limited use among war industries, the labor, power and other materials that go along with its manufacture have to be kept down to the minimum.

Further Cut in Paper Supply Likely

In spite of the recent restriction on production of newsprint, publishers both in Canada and the United States, have been warned that a further cut is not unlikely. One hears talk of possible reductions ranging all the way from another 5% to 25%. It may be pointed out that the present scale of operations, if maintained all through next year, would produce 3,050,000 tons of newsprint as a maximum. Another 5% cut would bring the tonnage down to 2,897,500 tons, or to approximately 66% capacity. In 1939 Canadian mills operated at 66.8% capacity, and produced 2,869,000 tons. A cut of 10% from the present figures would bring production down to 62.5% of capacity and a 25% additional cut would bring operations down to little better than half the possible production with present equipment.

Consumption of Canadian newsprint paper this year is estimated at just under 3.1 million tons. If all Canadian mills operate at the maximum permissible next year, assuming there are no further restrictions, supply would just about balance the demand—if the demand remained the same as for this year. Any further curtailment of operations than has been already prescribed would force newspaper publishers to limit the size of their papers, on some publication days at least, and cause them to scan closely all distribution, waste, etc., but would not likely compel them to reduce circulation.

Join N.E. Paper Association

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 14, 1942—The following paper merchants have become members of the New England Paper Merchants Association: G. & S. Paper Company, Inc., Newton, Mass.; the K. E. Tozier Company, Boston, and the Standard Paper Company, Waterbury, Conn.

"I guess they're looking for that rubber bone Swankie buried."

V-30-6/23

Drawn for Division of Information, OEM.

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STORING, GRINDING, HANDLING, OPERATION of rubber covered rolls are covered thoroughly in bulletins we have published to help you establish a practical maintenance and conservation program. These bulletins are available to you without cost or obligation along with Roll Service Record Books that make it easy to keep track of grinding data and service life. Write for a supply today.

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THE RUBBER ROLL SPECIALISTS

Newton Upper Falls, Mass.

Mill Employment Is Lower Than Last Year

Industrial Commission Reports 1 Per Cent Employment Gain in October But a Decline of 3.7 Per Cent Below Last Year—Payrolls Reflect Substantial Increase in October—Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 14, 1942—Paper production in Wisconsin mills and allied plants took a slight upswing during October but is still somewhat below the output of the same month a year ago.

This is reflected in the employment record compiled by the Wisconsin Industrial Commission, showing 23,300 workers on the payrolls as compared to 23,200 in September, 1942, and 24,100 a year ago. The gain for the month is 0.1%, and the decline over the previous year is 3.7%.

Payrolls increased 10.8% in October over September, from $721,000 to $799,000 average per week. This is a gain of 5.6% over October, 1942, when the weekly average stood at $756,000.

Hourly earnings now average 79.1 cents. The average work week has been stepped up to 43.4 hours, and the weekly pay check now averages $34.36.

Milwaukee's metropolitan area, largely in the converting and specialty field, dropped 0.1% to 1,873 workers for October as compared with September. Weekly payrolls at an average of 75 cents per hour were $62,418 in the 19 plants reporting, a gain of 3.2% over September. Workers are putting in an average of 44.4 hours per week, earning $33.33.

Kimberly Mill Leads in Bond Sales

Although all of the mills of the Kimberly-Clark Corporation are making an outstanding record in war bond and stamp purchases, the employees at Kimberly, Wis., top the list. A survey shows that 1,300 workers, or 98.9%, are having deductions made from their pay checks regularly. Of these, 63% are investing 10% or more of their earnings. The goal now is to increase the number in the latter group.

Thilmany Workers Plan Family Program

Employees of the Thilmany Pulp and Paper Company, Kaukauna, Wis., are planning a special family program to be held Saturday, January 16, at the high school, under sponsorship of the Girls' Club. A homemaking speaker has been engaged for the afternoon for the women, and there will be entertainment and an outstanding speaker in the evening. An exhibit of safety devices will be conducted under the direction of L. C. Smith, personnel director.

F. J. Sensenbrenner Elected by N.A.M.

F. J. Sensenbrenner, chairman of the board of Kimberly-Clark Corporation, Neenah, Wis., has been elected a regional vice-president of the National Association of Manufacturers. He was chosen by the board of directors during the annual convention in New York City. Mr. Sensenbrenner will take office January 1, 1943.

Seaborne-Mackley Nuptials

Corporal Charles R. Seaborne, Jr., Appleton, Wis., and Miss Jane Mockley, Whitefish Bay, Wis., will be married Christmas day at All Saints' Episcopal church at Appleton. The bridegroom is stationed at Fort Macon, N. C., where the couple will reside. His father, Charles R. Seaborne, is vice-president in charge of production for the Thilmany Pulp and Paper Company, Kaukauna, Wis.

Hans B. Peterson Dead

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 14, 1942—Hans B. Peterson, 80, sales representative for many years for the Marshall Paper Company here, died Thursday, December 10, at the home of his daughter, Mrs. N. F. Verbrick, Menasha, Wis. Funeral services were held at Appleton Saturday, December 12, and burial was made in Highland Memorial Park of that city.

Discuss Cut in Printing Papers

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Dec. 14, 1942 — A ground plan for use in any consumption curtailment of printing papers in line with current and probable future curtailments in the production of such papers was discussed at a recent meeting of the Book Publishing and Manufacturing Industry Advisory Committee.

Members discussed the effect of the existing "freeze" order controlling the production of printing papers at the mills which, it was stated, approximated an average 15% reduction in available tonnage.

A joint meeting was held between the Task Group of the Commercial Printing, Lithographic and Gravure Industry Advisory Committee and representatives of the Book Publishing Committee on December 10 for the purpose of reviewing and correlating the plans recommended by both committees for use in consumption curtailment controls.

All measures discussed at both meetings were in line with already instituted or anticipated tonnage limitations.

Lieut. Comdr. Walter at Washington

Lieut. Comdr. L. Rohe Walter, U.S.N.R., former advertising manager, the Flintkote Company, New York, and immediate past president, the Direct Mail Advertising Association, Inc., on leave of absence from his company for the duration, is assigned to duty on the Army and Navy Munitions Board, Washington, D. C.

Canadian Pulp Exports Expand

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 9, 1942—As a result of the withdrawal of Scandinavian competition and sharply increased consumption in the United States, Canada's pulp exports for the first seven months of 1942 have quadrupled over a like period for 1941, according to a recent report to the Department of Commerce.

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Paper Demand At High Level in Chicago

Sales of Book, Sulphite Bond, Kraft and Many Other Grades of Paper Continue Active Under Influence of Impending Curtailment of Production — Court Grants Use of Paper Milk Containers.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, December 14, 1942—The paper industry began to "close books" on 1942 none too secure about 1943. Not only was the industry worried about the effect of curtailment orders and the dislocations arising therefrom but it was also worried over the outlook for heavy taxation, man power shortages and a well developed plan on the part of the Government to ration expenditures to endeavor to siphon off what is termed a $40,000,000,000 "inflation gap."

Despite these worries, there are sufficient orders to keep the merchants and sales representatives busy. Book paper representatives here report the development of outstanding order backlogs. Sulphites are equally in demand while kraft back logs are reported to have grown from week to week as buyers rushed in to get ahead of drastic production curtailment. Newsprints and groundwoods were in the same situation as the combination of shortages and curtailments found a rush to buy on all sides. The waste paper market was likewise active.

Warren Promotes Industry Importance

The S. D. Warren Company has made a noteworthy contribution to the survival of the paper industry, and of book papers in particular, during a war period. It has issued "Promoting the Security of Business," a 104-page well printed pamphlet which does not mention lowered quotas but which does stress the importance of paper in carrying messages of definite help to the war effort. The implication throughout the pamphlet is that a too-heavy curtailment of the book paper output would hamper valuable informative services and definitely restrict important business operation at a critical time.

Folding Box Business Gains

The Folding Paper Box Association, a few short months ago finding orders extremely scarce, is now reporting November paper box order bookings indicating a gain of 25% over the very active month of 1941. Whereas the industry had formerly suffered by government publicity which caused buyers to discard the use of folding boxes, that same government publicity which came along with the restricted production basis development has caused a rush of orders from those who have come to appreciate the importance of the folding box in the sale of their product. To the folding box industry, the government order is reported to mean an operating ratio of about 85% of capacity. The rush of orders began immediately although the industry is not very pleased over the recovery because of the danger of prolonged starvation later on.

The book paper industry is likewise in the same situation. Book paper mills are now building up order backlogs extending as much as two months ahead with the expected curtailment order adding "fuel to the flames."

Grants Use of Paper Milk Containers

The city of Chicago this week lost its five-year fight against the sale of milk in paper cartons when Circuit Judge Epstein decreed that the temporary injunction issued against the city be made permanent. However, corporation counsel Hodes indicates he still wants to find out if Chicago's "home rule" is not sufficient to permit its city council to pursue its own course of action. Under the temporary writ the city authorities have been enjoined from interfering with the sale of milk in paper containers for two years. The judge declared the 1935 city ordinance is null and void. This ordinance ordered that "milk or milk products sold in quantities of less than one gallon shall be delivered in standard milk bottles." At the time the ordinance was written, the court reasoned, standard milk bottles were made of glass. But with the development of packaging, glass bottles are being replaced by paper containers. The standard bottle today could well be made of paper, the court held.

Salesmen To Hold Annual Party

The western division of the Salesmen's Association of the Paper Industry this week voted to continue its annual Christmas party despite war time conditions. The annual event, always a stand out performance of the salesmen's social season, will again be held at the Hotel Sherman on December 21. Ben Babbitt, perennial master of ceremonies, will again be on hand to arrange the entertainment which has always been of the highest order. It was indicated that the majority of the salesmen felt the sentiment of the party was too great to pass up and that it would not in any way interfere with the war program.

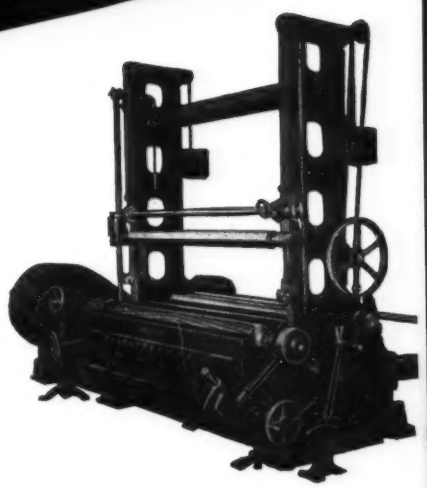
Claim Benefits of Cuban Agreement

Importers of various papers who had claimed the benefits of the Cuban Reciprocal Trade Agreement for goods imported from other countries have abandoned a large number of cases in which this issue was raised. The importers had claimed that the Most Favored Nation Treaties gave all countries the benefit of the 20 percent reduction specifically granted to Cuban products. Cases in which this claim was abandoned, according to the Import Committee of the American Paper Industry, included the following: Two of Finnish pulp board; four of German manifold; two of German drawing paper; five of German tracing paper; six of Italian carbonizing tissue; three of Swedish wallboard; two of Swedish sulphite wrapping; two of Chinese tea wrappers; ten of Japanese tissue; and one each of French parchment, German bowl paper, French papeterie, English papeterie, French wrapping, Swedish kraft, Japanese automat tissue, German printing, Scotch esparto printing and Japanese japan printing paper.

FROM JOB TO JEEP . . .

Every punch on a time clock is a punch that punishes our enemy. Here, as in hundreds of other places, paper does its part.

To the men and machines backing up the plural fronts, nothing less than 100% effort is expected. And that is what we all must deliver.



SAMUEL M. LANGSTON COMPANY, Camden, New Jersey

LANGSTON

Slitters and Roll Winders

Motor Finder Slide-Rule

To help motor users to fill their wartime motor needs with the least possible delay, as well as conform to recent WPB recommendations, Allis-Chalmers now offers a new "Motor Finder" for quickly selecting the various types of squirrel-cage motors.

Standard types of the squirrel-cage — the most readily obtainable motor—are actually even more versatile than is commonly realized, this prominent motor manufacturer points out. Because of this, and important savings in time and materials due to standardization, WPB is urging careful consideration of the squirrel-cage types first.

With the new "Motor Finder" slide-rule, the motor user is able to match the conditions under which the motor must operate at the proposed installation with the required motor characteristics and instantly learn the right motor type and its features.

So handy is the new "Motor Finder," that only three simple steps are necessary to pick a motor. Since over thirty standard types, covering a range in horsepower from ½ to 75, are included in the Allis-Chalmers Lo-Maintenance line, all of the characteristics of versatility of squirrel-cage motors are immediately considered in using the slide-rule. The potential motor buyer thus takes fullest advantage of the most available motors he can buy in wartime.

Copies of the new slide-rule can be obtained free of charge on request from the Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

T. W. Howard Made Manager

Ralph Bradford, general manager of the Chamber of Commerce of the U. S. A., announces the appointment of Thomas W. Howard as manager of the Chamber's Department of Manufacture.

Mr. Howard is a graduate of the Worcester Polytechnic Institute. He has had extensive experience in factory management and in the operation of manufacturing trade associations. As controller of the National Electrical Manufacturers Association, he promoted the use of uniform accounting procedures by its members and organized the extensive statistical activities of the association. He has engaged, also, in professional practice in industrial engineering with particular reference to the design and installation of factory management procedures.

Mr. Howard for many years was a member of the Society for Industrial Engineers and is now an officer of the National Association of Cost Accountants. He is the author of numerous treatises on management procedures. For the past five years he has been Assistant Manager of the department of which he now becomes Manager.

The National Chamber's Department of Manufacture, represents a large and important sector of American business. It brings forward the points of view of manufacturers and their organizations on all subjects appropriate for consideration and action by the National Chamber. The department also provides an information service on timely subjects of general concern to manufacturers.

The activities of the department will be conducted with the counsel and guidance of a committee of representative executives from many branches of the manufacturing industry. This committee is under the chairmanship of W. Homer Hartz, President, Morden Frog and Crossing Works, Chicago, who is also a member of the Chamber's Board of Directors.

It will be the purpose of the Chamber, through this department, to make its services increasingly useful—to manufacturers and their organizations, and to the agencies of the government, particularly those having to do with the prosecution of the war.

Acme Steel Workers Get $235,000 Bonus

Christmas checks totalling more than $235,000 will be distributed this week to 3,000 plant and office workers of Acme Steel Company, Chicago, according to an announcement made yesterday by Charles S. Traer, president. Similarly remembered will be the more than 400 Acme employees now in the armed services in all parts of the world. Present employees whose service with the the company began on or before July 1, 1942 will be given the equivalent of two weeks' salary or eighty hours pay at basic hourly rates. Bonuses for those whose employment dates from July 2, 1942 will be based on one week's salary or forty hours' pay at basic hourly rates. Checks for all Acme employees in the service will be on the same basis.

Estate of August F. Richter

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., December 13, 1942 — Announcement from the county clerk reveals that the gross estate of the late August F. Richter, former head of the Stebbins Engineering Company, has been appraised at $94,974.76. The net estate after deductions from the gross amounts to $89,298.77 which is bequeathed to members of his family under terms of the will. In addition to the gross estate there is $70,949 in life insurance, of which $59,000 goes into a trust fund set up by Mr. Richter in 1938 with the Jefferson County National Bank as trustee. The widow, a son and several relatives are the principal beneficiaries.

Parsons & Whittemore to Give Bonus

Eli de Vries, president, announces that the directors of Parsons & Whittemore, Inc., 10 East 40th street, New York, have voted to pay an eight per cent dividend on the preferred stock. They have also voted, besides paying the usual annual salary increases, to distribute a bonus to every member of the staff.

Pulp Producers to Make Alcohol

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 9, 1942 — The Swedish pulp producers, Forss AB of Kopmanholman, have recently erected a new plant for the manufacture of wood alcohol, according to a report to the Department of Commerce. Production has already been started.

MAKE BEARINGS LAST FOR THE DURATION . . . AND THEN SOME

● IT'S TOUGH on you that some of the bearings you may need are being thrown at the Axis, right now. In the meantime, no priority rating is needed to get longer life from the bearings you have.

It won't take a great deal of your time, either, if that's also scarce. Let a Standard Lubrication Engineer show you how. Here's a typical example of the results you can expect.

Calender stack bearings were failing much too frequently in a Michigan mill. They were high grade roller bearings, too. The bearing manufacturer was called in. Was there anything wrong with the design or installation of the bearings? None could be found. Then, the manufacturer had a Standard Lubrication Engineer look at the job. There was evidence that the grease being used would not stand the heat of the calender rolls. Oil separated from the soap, leaving hard deposits in the bearings. Rollers failed to turn, causing excessive wear.

The Engineer recommended a grade of Superla Grease that would meet these conditions. That was more than a year ago. Today on four calender stacks equipped with these bearings, there has not been a failure. Grease consumption has been cut 20%.

Call in a Standard Oil Engineer *before* you have bearing trouble. Let him make a Lubrication Survey of your mill. It costs nothing but a phone call or card.

HERE'S WHERE YOU'LL FIND A STANDARD OIL ENGINEER

Call any local Standard Oil Company (Indiana) office in the middle western states listed below, or write 910 South Michigan Ave., Chicago, Illinois.

COLORADO • ILLINOIS • INDIANA • IOWA • KANSAS • MICHIGAN
MINNESOTA • MISSOURI • MONTANA • NORTH DAKOTA
SOUTH DAKOTA • WISCONSIN • WYOMING

OIL IS AMMUNITION . . . USE IT WISELY

STANDARD OIL COMPANY (INDIANA)

CONSTRUCTION NEWS

Under limitations order L-41 all projects involving expenditures of more than $5,000 must be specifically approved by the War Productions Board. The status of projects reported herewith under the provisions of the order is not known.—EDITOR.

New York, N. Y.—The Wilson Paper Stock Company, 603 Greenwich street, commercial paper products, has leased space in building at 422 East 56th street, and will occupy for expansion in storage and distributing departments.

Rochester, Mich.—The Rochester Paper Company, manufacturer of blotting and other absorbent paper stocks, is operating on a capacity scheduled with large part of output for Government account. In addition to blotting papers for Federal service, output includes photographic, filter and impregnating papers. It is expected to hold to present production basis for an indefinite period.

Chicago, Ill.—The Harrison Corrugated Box Company, 1223 Lake street, manufacturer of corrugated boxes and containers, is considering early rebuilding of portion of plant recently destroyed by fire, with loss reported close to $25,000, including equipment. Company occupies a portion of building at location noted. Another section is used by the Weisman Box Company, dealer in corrugated and other paper boxes, which also sustained a fire loss; no official estimate of amount has been announced.

New York, N. Y.—The Grand-City Container Corporation, 622 West 57th street, New York, manufacturer of corrugated boxes and containers, with plant at 128 32nd street, Brooklyn, N. Y., has leased space in building at 534 West 58th street, and will use for expansion in storage and distributing departments.

Chicago, Ill.—The Royal Continental Box Company, 908 North Leavitt street, manufacturer of paper boxes and containers, has begun work on proposed new addition to plant, recently referred to in these columns, and will push to early completion. It is reported to cost in excess of $30,000, including equipment. The Valentine Construction Company, 3531 North Neva street, Chicago, has the general erection contract. Adolph Woerner, 3166 Lincoln avenue, is architect.

Cleveland, Ohio—The Dobeckmun Company, 3301 Monroe street, manufacturer of cellophane bags, containers, sheets, etc., is running on a maximum capacity at its converting plant, with large part of output for Government service. Capacity of the laminated paper division has been increased with the modernization of machinery and equipment, and is now given over practically 100 per cent to materials for war purposes. The company has recently developed a container to replace metal cans for such products as household shortening and allied specialties. It is expected to hold to capacity output in the different divisions for an unlimited time.

New York, N. Y.—The American Label Company, 216 West 18th street, manufacturer of paper labels and kindred products, has leased additional space in building at location noted, comprising part of third floor, and will use for expansion in storage and distributing division.

New Incorporations

New York, N. Y.—The Mill Printing and Paper Products Corporation has been incorporated with capital of 225 shares of stock, no par value, to deal in paper goods of various kinds. New company is represented by Maurice Abrams, 570 Seventh avenue, New York, attorney.

Chicago, Ill.—The Bernet Poster Corporation, 512 South Sherman street, has been organized with capital of 10 shares of stock, no par value, to deal in paper goods for display and other purposes. It is proposed to operate a local converting plant. Incorporators include F. B. Zenk and F. Wilcox.

Valentine Hollingsworth Dead

Valentine Hollingsworth, president of Hollingsworth & Vose Company, paper manufacturers at East Walpole and West Groton, Mass., died at the Faulkner Hospital, Boston, December 10.

The son of the late Zachary T. and Ida Hollingsworth, he attended St. Paul's School, Concord, N. H., and was graduated from Harvard College in 1906.

He had been president of the paper mills in East Walpole and West Groton since 1922 and resided alternately at 191 Marlborough street and York Harbor, Me.

He was a member of the Tennis and Racquet Club, the Harvard Club of New York, the American Antiquarian Society and the Walpole Society.

He leaves his widow, the former Reubenia McCormick of Baltimore, two sons, Ensign Mark Hollingsworth, U.S.N.R., and Priv. Valentine Hollingsworth, Jr., U.S.M.C., and a brother, Amor Hollingsworth of Milton, chairman of the board of Tileston & Hollingsworth.

Funeral services were held in the chapel of Emmanuel Church, Milton, Saturday at 2 p. m.

Revoke Crepe Paper Regulation

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 16, 1942—Because of duplication in listing maximum retail prices for unprinted single weight crepe paper in folds, OPA revoked Amendment No. 47 to Supplementary Regulation No. 14 to the General Maximum Price Regulation.

The identical provisions of the revoked amendment are contained in Amendment No. 10 to Maximum Price Regulation No. 129 covering industrial and converted paper products issued Nov. 6. The maximum retail price of 9 foot folds of crepe paper of the above description remains unchanged at 10 cents until February 15, 1943, on which date the maximum price must be reduced to 9 cents.

The revocation is contained in Amendment No. 75 to Supplementary Regulation No. 14 to the General Maximum Price Regulation, and becomes effective December 14.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending December 12, 1942

STOCKS

	High	Low	Last
A. P. W.	1½	1⅜	1½
Armstrong Cork Co.	31½	28⅝	31½
Celotex Corp.	7⅛	7⅛	7⅛
Celotex Corp., pf.	72	71½	72
Certain-Teed Products Corp.	2⅜	2⅜	2⅜
Certain-Teed Products Corp., pf.	32	30½	31
Champion Paper & Fibre Co.	18¾	18¾	18¾
Champion Paper & Fibre Co., pf.	100	99	100
Congoleum Nairn Co.	17⅜	16⅞	17⅛
Container Corp. of America	15¾	15½	15⅝
Continental-Diamond Fibre Co.	6⅞	6½	6¾
Crown-Zellerbach Co.	11	10¾	10¾
Crown-Zellerbach Co., pf.	80½	79¾	80
Dixie-Vortex Co.	9⅛	9⅛	9⅛
Dixie-Vortex Co.—A.	37	36⅜	36⅜
Flintkote Co.	15½	15⅜	15⅜
Robert Gair	1⅜	1⅜	1⅜
Robert Gair, pf.	9⅜	9	9⅜
International Paper Co.	8¼	7¾	8
International Paper Co., pf.	45¼	44⅜	44⅝
Johns-Manville Corp.	69½	67	68¾
Johns-Manville Corp., pf.	128	128	128
Kimberly Clark Corp.	25	25	25
MacAndrews & Forbes	18¾	18⅜	18⅜
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	32¼	31½	31½
Mead Corp.	6	5⅞	6
Mead Corp., pf.	58	55	58
Paraffine Companies, Inc.	38	35¼	36½
Paraffine Companies, Inc., pf.	101	101	101
Rayonier, Inc.	8⅝	8¼	8½
Rayonier, Inc., pf.	26½	25½	26½
Ruberoid Co.	20⅜	19½	20
Scott Paper Co.	38½	37½	38½
Scott Paper Co., pf.	113¼	113	113
Sutherland Paper Co.	25½	24¼	25½
Union Bag & Paper Corp.	7⅜	7⅛	7½
United Paperboard Co.	3⅛	2⅞	2⅞
U. S. Gypsum Co.	61	59½	60¾
U. S. Gypsum Co., pf.	173	173	173
West Virginia Pulp & Paper Co.	12¼	11¾	12¼

BONDS

Abitibi Pulp & Paper Co. 5s '53	48¾	48¾	48¾
Celotex Corp. 4½s '47	98½	98⅜	98⅜
Certain-Teed Products Corp. 5½s '48	95½	94⅜	95
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	105	104¾	104¾
International Paper Co. 5s '47	103¼	102⅞	103¼
Mead Corp. 4½s '55	....	....	....
West Virginia Pulp & Paper Co. 3s '54	103⅛	103¾	103⅛

New York Curb Exchange

High, Low and Last for Week Ending December 12, 1942

STOCKS

	High	Low	Last
American Box Board Co.	4¾	4⅝	4¾
Brown Co., pf.	....	....	....
Great Northern Paper Co.	25½	25	25
Hummel-Ross Fibre Corp.	3¼	2⅞	2⅞
National Container Corp.	8½	8	8
St. Regis Paper Co.	1⅜	1⅛	1⅛
St. Regis Paper Co., pf.	119½	118	118
Taggart Corp.	3½	3⅛	3⅛

BONDS

American Writing Paper Co. 6s '61	....	....	....

Hummel-Ross Votes Dividend

The Hummel-Ross Fibre Corporation resumed the dividend on the common stock with a declaration of 10 cents a share, payable December 29 to stockholders of record December 14. The only other payment this year was a similar amount made March 31, bringing total disbursements for 1942 to 20 cents a share, compared with 75 cents in 1941.

Puget Sound Declares Dividend

Regular quarterly dividend of 30 cents a share on the preferred stock of Puget Sound Pulp and Timber Company has been declared, payable January 1, 1943, to stockholders of record December 16, 1942.

B. C. Paper Co. Issues Bonds

B. C. Pulp and Paper Company, Ltd., is now issuing additional bonds to holders of general mortgage 7% bonds as settlement in part of interest arrears, and according to information received from the Company at Vancouver, B. C., these bonds will not constitute taxable income in the hands of the bondholders. A ruling to this effect has been made by Dominion income tax authorities in consideration of the fact that the interest which accrued in loss years and is being capitalized was not used as a deduction for income tax purposes by the company. Holders of the general mortgage bonds at a meeting in Montreal gave unanimous approval to the plan whereby $430,917 will be paid in cash within the next year and new bonds will be issued to the amount of $489,400. For each $1000 bond the holder will receive: $400 principal amount of new 7% bonds, $352.20 in cash (Canadian funds) of which $180 will be paid in 1942 and $172.20 in 1943. In view of the importance of conserving working capital at an adequate figure, the company arranged for a two-year loan of $1,000,000 secured by treasury first mortgage bonds.

Champion Nets $1.48

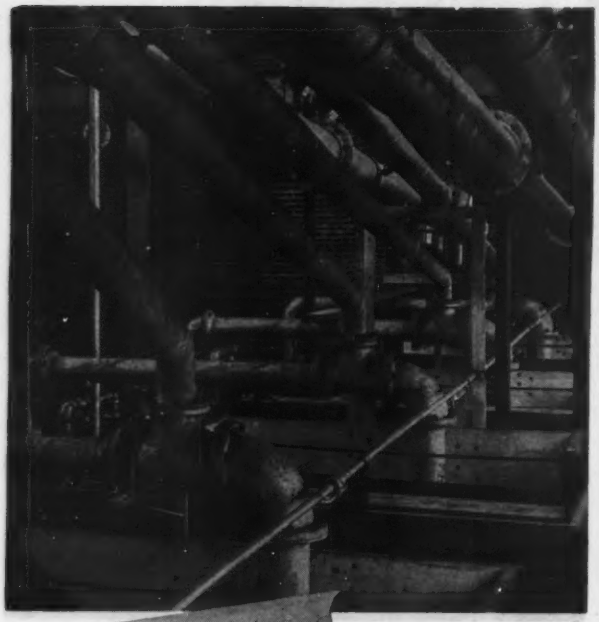
The Champion Paper and Fibre Company and subsidiaries for the twelve weeks to November 8, reports a consolidated net income of $936,921, equal after preferred dividend requirements, to $1.48 a common share. Report states that these earnings include income of five subsidiaries not previously consolidated and excludes an adjustment made in quarter of the excessive provision for Federal taxes charged in first quarter. Also included are net credits approximating $415,000, mostly due to effect of write-offs caused by recent financing on taxes based on income. Consolidated net income for sixteen weeks ended August 16, 1942, has been revised from $486,478, previously announced, to $672,763 in order to base provision for Federal taxes on the Revenue Act of 1942. These revisions adjust net income for this period from 58 cents to 92 cents a common share.

Southern Advance Gains

The Southern Advance Bag and Paper Company reports for the ten months to October 31, a net income after $1,426,528 Federal taxes on income was $566,971, equal to $2.47 each on 166,650 common shares after preferred dividend requirements. Net income for period in 1941 was $519,235, or $2.18 a common share.

Schumacher Profits Off

The Schumacher Wall Board Corporation for the six months to October 31, reports a net income of $73,161, equal after preferred dividend requirements, to 68 cents each on 66,000 common shares.



HERE'S A WARTIME TIP
ON PAPER MILL PIPING

When the war effort demands new paper mill piping here's how you can conserve time and labor. Just specify ARMCO Spiral Welded Pipe. With proper priorities it can be supplied in any diameter from 6 to 36 inches for plant piping or water supply lines.

ARMCO prefabricates pipe to fit your layout. Fewer joints are the rule because fittings come welded to straight pipe runs. The pipe can be prime-coated on the outside only, or hot dip galvanized after fabrication. For water supply lines you can get ARMCO Pipe with a spun enamel lining that assures sustained carrying capacity.

Use ARMCO Spiral Welded Pipe for war maintenance work or new lines. By specifying the one right size of "Spiral Welded" for the job you help conserve vital metal. Economical lengths up to fifty feet reduce costs and speed the work. Write to us for quotations and shipping promises. The American Rolling Mill Company, Pipe Sales Division, 2101 Curtis St., Middletown, Ohio.

ARMCO

ARMCO
SPIRAL WELDED PIPE

Others Can Do What Wheelwright Did

Bill Cunningham, the well known columnist, writing recently in the *Boston Herald*, said:—"Today, on Boston Common, the newest USO Service Men's recreational unit will be dedicated. It's an imitation brick cottage of fairly spacious proportions, contains the facilities of a gentlemen's club, is, of course for the free use of all men in uniform and will officially be named the Bay State Club.

"The occasion, and the plant, are newsworthy for two unique reasons. The first is because the Bay State Club is the materialized dream of just a plain, every-day citizen, who chanced to be walking across the Common one day thinking about soldiers and sailors even as you and I.

"His name is William Bond Wheelwright, a Harvard alumnus, engaged normally in the business of advertising. The Bay State Club was his idea. This is worth stressing because there isn't any reason why men such as Mr. Wheelwright in any town of any size couldn't do what he has done.

"That consisted of soliciting materials and fixtures from individuals and organizations, the advice and help of architects, contractors and similar folk—and then, the number two reason why the Bay State Club is especially newsworthy, the complete labor of building, painting, steam fitting and all was contributed by the various labor unions as a piece of patriotic service.

"It's that latter, I'm especially happy to salute, inasmuch as certain labor leaders, groups and organizations haven't always been complimented in these articles. There was nothing about them to compliment. But the various local groups rate a salute in this particular case. Operating with the permission of the mayor, the blessing of the policy committee of the Boston Soldiers and Sailors Committee, but authorized to solicit only materials and labor—no funds, lest the solicitation of money get in the way of the War Funds drive—Mr. Wheelwright, Ernst A. Johnson, John Munro, Chas. G. Loring, the architect, and the other gentlemen, who loaned their time and talents to the plan, found the local unions amongst their quickest allies.

"The various craft unions sent solid crews from their ranks, and paid them regular union wages from their several treasuries. That is, all but one did. That was the Painters Union. The Painters had no money in their treasury. So they came on, anyhow, in mass formation on Saturdays and Sundays, swarmed all over the new building in crowds of 65 and 70 and painted it completely with no compensation at all, other than the patriotic consciousness of having hit a lick for lonely men in uniform.

"Those chance to be the newsworthy features connected with today's unveiling of the smart little club, and it's not so little, at that, being 108 by 24 feet, and containing, among other things, a fine telephone room with crack operators handling eight long distance lines, a game room, a reception room, and a handsome "quiet room," with an open fire, comfortable chairs, books for reading and private arrangements for writing, this latter to be restricted to men in uniform only.

"But it strikes me that an incidental statistic on the USO records is the most newsworthy of all, and that it throws the door wide upon a much bigger subject—possibly the biggest subject in the world, as it stands today, the character of the United States service man."

Paper Mill Accidents Increase

CHICAGO, Ill., December 14, 1942 — Sharp increases in accident frequency rates were reported in all divisions of the National Safety Council's 1941-42 contest for plants in its Paper and Pulp section, the council reported today. Accident frequency rates for all participants averaged 16.45 reportable injuries per 1,000,000 man-hours worked, and were, on the average, 16 per cent higher than in the 1940-41 contest. The rates soared in the remanufacturing plants, averaging 33 per cent higher than in the previous contest.

Among the paper mills, the "large plants" group had the lowest rates, averaging 14.42. There were nine perfect records for the contest year and of these, the Parsons Division of the American Writing Paper Corporation, competing in the Paper Mills division of the contest, worked the most hours without a disabling injury. The Thilmany Pulp and Paper Company's Bag Mill at Kaukauna, Wis., had the best record in the Remanufacturing Division.

Winners in the four contest divisions and their accident frequency rates are:

PAPER AND PULP

Large plants: 1. Price Brothers & Co., Ltd., Riverbend, Quebec, 2.45. 2. The Flintkote Company, Pioneer Divisions, 2.72. 3. Anglo-Canadian Pulp and Paper Mills, Ltd., Limoilou, Quebec, 3.48.

Medium Large Plants: 1. Quebec North Shore Paper Company, Baie Comeau, Quebec, 0.85. 2. St. Croix Paper Company, Woodland, Me., 1.11. 3. Hoberg Paper Mills, Inc., Division A, Green Bay, Wis., 1.86.

Medium Small Plants: Three companies tied with perfect records—American Writing Paper Corporation, Parsons Division, Holyoke, Mass.; The Mead Corporation, Harriman Division; Marathon Paper Mills Company, Ashland Division, Ashland, Wis.

Small Plants: Three companies tied with perfect records—United States Gypsum Company, North Kansas City, Mo.; Spaulding Fibre Company, Inc., Milton, N. H.; Spaulding Fibre Company, Inc., Hayes, N. H.

PAPER AND BOARD REMANUFACTURING

Three companies tied with perfect records: Thilmany Pulp and Paper Company, Bag Mill, Kaukauna, Wis.; Bird & Son, Inc., Roofing Plant, Shreveport, La.; Bay West Paper Company, Green Bay, Wis.

Bruce Crocker Returns to Whitaker

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., December 14, 1942—Bruce Crocker, a well known sales executive of the Crocker-Burbank Papers, Inc., has recently become associated with the Whitaker Paper Company of Chicago. Mr. Crocker has been identified with the Crocker-Burbank interests for over eight years and is widely known in this territory. His entire business career has been spent in the paper trade, going back to 1919 when he became affiliated with the Paper Mills Company. He remained with this company until 1932 when he was employed by Whitaker, the company he returns to in his new connections. Mr. Crocker will serve as vice-president and general manager of the Whitaker Paper Company in this "homecoming."

APPLETON

PAPER AND PULP MILL MACHINERY

THE engineering and manufacturing skill we have gained in building machinery for paper mills is now devoted to the rapid production of vital equipment needed by America at War. We are thankful to be able to make a real contribution to our national security. From it we shall bring new skill to the building of machinery for the paper industry in America at Peace.

THE APPLETON MACHINE COMPANY
APPLETON WISCONSIN

Belting Men Elect Officers

The American Leather Belting Association held its annual meeting in New York on Friday, December 4. The officers elected at this meeting were: President, Roy C. Moore, of Charles A. Schieren Company, New York; Vice-President, George L. Abbott, of Graton Knight Company, Worcester, Mass.; Treasurer, Arthur H. Rahmann, George Rahmann & Co., New York.

The new members elected to the board of directors were: C. Carter Bond, manager of Charles Bond Company, Philadelphia, Pa.; Roy C. Moore, Vice-President of Charles A. Schieren Company, New York; Frank F. Raniville, President of F. Raniville Company, Grand Rapids, Mich.

The members who remained on the board and who will carry through the year are: George L. Abbott, Vice-President Graton Knight Company, Worcester, Mass.; Edward B. Ball, President Chicago Belting Company, Chicago, Ill.; P. J. Slowey, President Holyoke Belting Company, Holyoke, Mass.; Major A. E. Carpenter, President E. F. Houghton & Company, Philadelphia, Pa.; William T. Bell, Vice-President, Page Belting Company, Concord, N. H.

The Headquarters Office will be maintained at 53 Park Row, New York.

Affects Only Wisconsin and Michigan

WASHINGTON, D. C., December 9, 1942 — Only pulpwood cut or sold in Wisconsin and Michigan not subject to the provisions of the Maximum Price Regulation No. 257 must meet all three requirements of having been cut, peeled and sold prior to November 7, according to OPA.

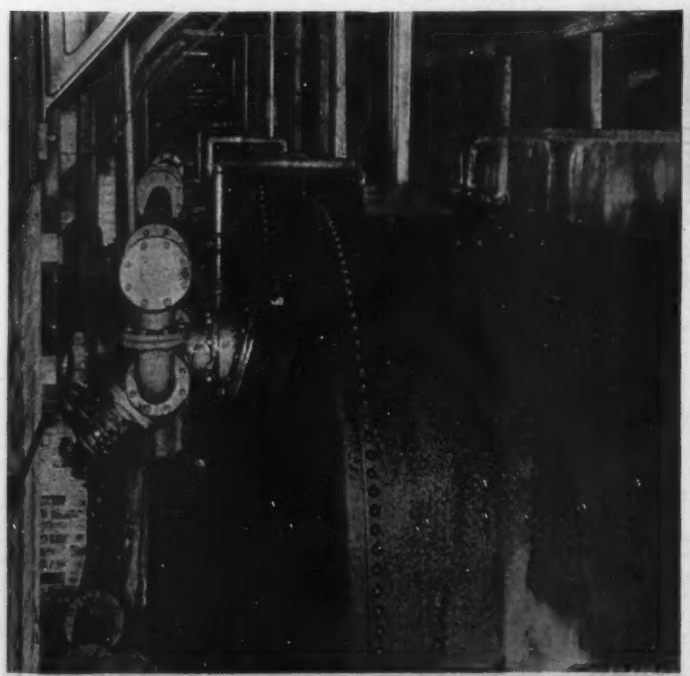
Regulation 257 established specific dollars and cents prices for the various grades of pulpwood cut or sold in the three states, known to the trade as the Lake Central area, but provided that pulpwood which had been cut, peeled and sold (or contracted to be sold) before November 7 was excepted.

According to information reaching OPA some contractors and sellers of pulpwood have erroneously interpreted the provision of the regulation dealing with exceptions and are of the opinion that pulpwood, which met any one of the three requirements, was excepted. Rough wood is not covered by the exception provision and all rough wood, unless delivered and paid for prior to November 7, is under the control of the regulation.

OPA also warned that broker's commissions must not be paid if the effect of such a payment is to increase the price of the pulpwood to an amount in excess of the specific ceiling prices established by Regulation 257.

N.E. Wrapping Div. To Hold Luncheons

BOSTON, Mass., December 14, 1942—The Wrapping Paper Division members of the board of directors of the New England Paper Merchants Association voted on December 8 that regular luncheon meetings of the division are to be held on the first and third Tuesday of each month. The following dates have been reserved: December 15, January 5 and 19, February 2 and 23, March 2 and 16, April 6 and 20, May 4 and 18. Out of town members are urged to drop in at these regular meetings whenever possible.



NORWOOD FILTERS WILL GIVE YOU BETTER PROCESS WATER

YOU may have to have your Norwood filter installation placed in some out-of-the-way place, such as this installation of Norwood Pressure Filters . . . but you can always depend upon them to give you better process water. Norwood Filters are the result of nearly half a century of working with paper mill men. They will help you keep spots and specks out of your paper . . . and will stand up for years of efficient, trouble-free service.

Send For Engineering Data Units

Write for your copy of Portfolio F . . . a complete set of engineering data units on pressure and gravity filters.

Get a Good Start And a Good Finish With
NORWOOD
WATER FILTERS AND PAPER FINISHING MACHINERY

The **Norwood Engineering Company**
17 No. Maple St., Florence, Mass.

H. E. Houghton Elected Vice Pres.

Harry E. Houghton, for the past five years, general sales manager of Brown Company, Berlin, N. H., producers of pulp, paper and other wood cellulose products has been elected vice president in charge of sales by the directors of that company, according to

HARRY E. HOUGHTON

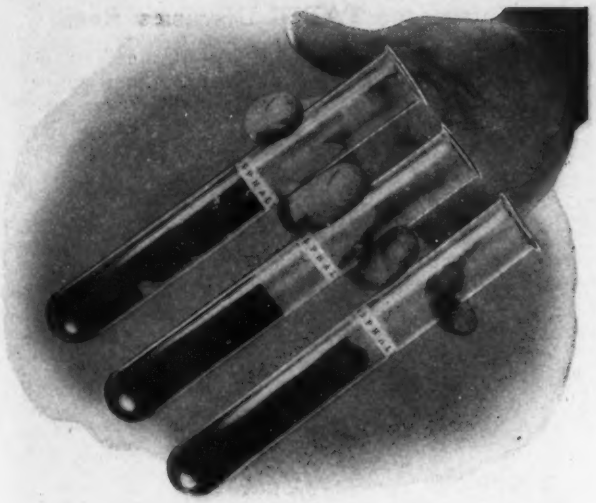
an announcement from H. P. Carruth, vice president in charge of operations. The company maintains general sales offices at 500 Fifth Avenue, New York.

Previous to his connection with Brown Company, Mr. Houghton was identified with the advertising agency business as a vice president of both Sherman K. Ellis Co. Inc. and Geyer Cornell & Newell.

War Legislation Questioned

Another factor that has come up recently to plague those trying to forecast the future of pulp and paper investments is the doubt that has been cast on the validity of much of Canada's war legislation by recent court decisions. Two judges in different parts of Ontario have ruled against measures based on the War Measures Act of 1914, an act upon which most of the present wartime regulations have been based. The government is losing no time in referring all legislation passed under the Act to the Supreme Court. If the Supreme Court finds against the War Measures Act, every item of legislation that has been based on it will come into question, including price ceilings, control regulations, production schedules and other provisions.

Someone has figured out that there must be a paper shortage because it requires ten tons of paper to make the blueprints for one battleship. It is admitted that there are not very many battleships being built right now, but it is pointed out that here are large numbers of smaller warships, merchant ships, planes, tanks and guns and other equipment, and all require their quota of blueprints. Four large packing boxes, for instance, it is pointed out, are needed to hold the blueprints required for building a single moderate-sized airplane. One would think from all this that a complete set of blueprints was required for every separate airplane made.



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Kalamazoo TAPPI Discusses Resin

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry held their third meeting of the year at the Park American Hotel on Thursday evening, December 3. F. D. Elliott, of the Michigan Research Laboratory, presided as Chairman.

The Chairman presented the speaker of the evening, J. G. Little, assistant group director, Resin Department, Hercules Powder Company, Experiment Station, Wilmington, Delaware. Mr. Little gave an exceedingly interesting talk on various resins that have been developed using rosin as a starting point. At the present time, all development work in the Resin Department of the Hercules Powder Company is directed to produce products to speed up the prosecution of the war. Many of the resins thus far developed can be used to treat paper and paper board so that it can be used as a substitute for metal for various purposes.

Samples of various resins were passed around among the members and it was exceedingly interesting to note the wide range of physical characteristics that had been produced by the chemical modification of rosin.

Some of the samples shown were quite elastic and after stretching would return almost to their original dimensions.

At the present time many of these resins are being used in commercial quantities to impart various properties such as greaseproofness to paper. Other uses are modifiers for wax, coating compositions, transparentizers for paper, adhesives for waxed surfaces, lacquered surfaces, glassine, to reduce viscosity of laminating asphalts and in combination with casein to produce an absolutely clear homogenous flexible film that is greaseproof and has a very low rate of moisture vapor transmission.

The following members and guests were present: A. L. Bachelder, P. W. Bartholomew, Ray L. Barton, B. L. Batty, A. F. Brunell, S. A. Brunell, Robert Buss, William R. Chevey, James A. Dean, Arthur G. Dreis, Jas. J. Eberl, F. D. Elliott, D. R. Erickson, L. E. Fitzgerald, Jas. Foxgrover, R. C. Germanson, F. R. Hamilton, W. F. Hathaway, J. A. Heenan, Walter J. Higbie, Reginald Hurst, W. A. Kirkpatrick, L. H. LaLiberte, Paul L. Lefebre, B. H. Little, J. G. Little, N. J. Maguire, Hoke Martin, R. J. Mashburn, H. L. Mellen, P. F. Neumann, A. E. Regnier, Paul Schreiber, Hugh Smith, Homer E. Stafford, E. B. Taylor, W. S. Taylor, Paul Thomas, Joe Waber and Harris O. Ware.

Pehr Sparre Heads Pulp Importers

Pehr Sparre, vice president of the Cellulose Sales Company, was re-elected president of the association of American Wood Pulp Importers at its annual meeting Thursday of last week at the Hotel Waldorf-Astoria. Other officers re-elected were: Vice president, A. J. Pagel, vice president of Pagel-Horton, Inc.; secretary, B. Lindell, Cellulose Sales Company, and treasurer, Allan J. Miller, vice president of Perkins-Goodwin Company.

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CAMACHINES play an important role in keeping our armed forces supplied with a tremendous flow of ammunition. Tons and tons of chipboard, wad paper, partition paper, and overlay stock are used in the manufacture of ammunition.

The machines which are used to process these papers must be supplied with rolls cut to the proper width and uniformly wound for easy handling. The processing machines are fast and they are running at top speed. It takes a fast slitter and roll winder to keep ahead of the pace. That is why we recommend CAMACHINE 10-6, which runs up to 1500 F.P.M. on paper or 650 F.P.M. on board. The slitters on CAMACHINE 10-6 can be spaced to widths from ½" up. Rolls can be rewound in diameters up to 30". Write for illustrated folder.

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Produce Less Newsprint

Production of newsprint in Canada during November 1942 amounted to 251,147 tons and shipments to 255,087 tons, according to the News Print Service Bureau. Production in the United States was 75,065 tons and shipments 76,207 tons, making a total United States and Canadian news print production of 326,212 tons and shipments of 331,294 tons. During November, 20,496 tons of news print were made in Newfoundland, so that the North American production for the month amounted to 346,708 tons. Total production in November 1941 was 410,695 tons.

The Canadian mills produced 192,131 tons less in the first eleven months of 1942 than in the first eleven months of 1941, which was a decrease of six and one tenth percent. The output in the United States was 55,271 tons or five and nine tenths percent less than in the first eleven months of 1941, in Newfoundland production was 62,360 tons or nineteen and five tenths percent less making a total decrease of 309,762 tons, or seven and one tenth percent less than in the first eleven months of 1941.

Stocks of news print paper at the end of November were 91,325 tons at Canadian mills and 10,168 tons at United States mills, making a combined total of 101,493 tons compared with 106,575 tons on October 31, 1942, and 151,934 tons at the end of November 1941.

Miss. Delta Forests

The Southern Forest Experiment Station, 2134 St. Charles avenue, New Orleans, La., has just issued Forest Survey Release No. 53, "Forest Resources of the Delta Section of Mississippi," by W. S. Stover. It is one of a series of forest resource reports for subregions of the Lower South prepared and issued by the Forest Survey of the Southern Forest Experiment Station. Because of war time conditions, we make no apology for the obviously cheapened format of this report.

The report describes the forestry conditions of an interesting and perhaps unique section of the South. It describes in detail the timber stands, including data on forest acreage, timber volumes, growth, forest drain, and the forest-using industries.

A broad program of action is suggested to improve and perpetuate the remaining forest resource so that it can contribute its full share to the economic development of the subregion.

This picture is of anything but a camp meeting. It represents a colored school teacher and his vocational class of boys attending a pulpwood cutting demonstration, sponsored by the Brunswick Pulp and Paper Company in Glynn County, Georgia.

Paper now rules where Cotton was once King. This peaceful revolution has brought into the South many a reliable *Draper Felt.*

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PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger

EDITOR

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COMING EVENTS IN PAPER INDUSTRY

American Paper and Pulp Association, Sixty-sixth Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 15-19.

Technical Association of the Pulp and Paper Industry, Convention, Commodore Hotel, New York, February 15-18.

National Paper Trade Association of the United States, Convention, Waldorf-Astoria Hotel, New York, February 15-18.

The New York Association Of Dealers In Paper Mills' Supplies, Annual Banquet, Commodore Hotel, New York, Tuesday, February 16.

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

PAPER AND PULP

Paper consumption in the United States rose to nearly 300 pounds per person in 1941. This indicates that this country consumed over half of the world's production of paper or more than double that of any other country, according to "The Paper and Pulp Industries of New York State," published by the Division of Commerce, State of New York, Albany, N. Y. "Paper consumption," the booklet states, "has increased steadily in the United States at a much more rapid rate than that of the population, for per capita consumption has increased with a growing percentage of literacy; with penny newspapers, nickel magazines, and dollar books; and with the substitution of paper for other materials in packaging, building, hygiene and myriad other fields. . . . Consumption of paper probably will continue to expand. In addition to the expansion of total consumption which doubtless will accompany future increases in population, there is reason to anticipate further increases in per capita consumption. Additional uses for paper are being developed constantly and many of these already developed have not come into general use."

This publication presents an economic analysis of the subject and reports trends in the paper and pulp industries of New York State. The text is comprehensive and includes not only New York but other important and leading paper and pulp producing centers in other states; it discusses the influences of foreign trade, costs on the location of plants, costs of pulpwood, raw materials and other materials to the paper industry.

In discussing the status of New York State in the industry, the analysis points out that "New York is still the leading state in the production of paper, but its lead has been steadily decreasing. In 1940, New York accounted for 10.1% of the total United States paper production; compared with 16.4% in 1925. In terms of absolute quantities, a definite downward trend has not yet started. In 1940, production was below the 1929 peak, but in 1941 production apparently reached a new high. In the production of wood pulp the decline has been much greater. Prior to 1916, New York was the leading pulp producing state, but by 1941 it had fallen to sixth place. A decline of 37% in terms of absolute quantities of pulp produced was recorded between 1920 and 1940. With the relatively greater decline of the pulp industry, the character of the paper industry in the State has changed. Formerly dominated by integrated pulp and paper mills, New York's paper industry now consists principally of paper mills which purchase pulp. The leading class of paper produced in the State formerly was newsprint, which almost universally is produced by integrated pulp and paper mills; the leading class now is paper board, which is produced primarily from waste paper."

In summarizing the factual causes for the changing character of the paper industry in New York State, the analysis states in part that, "Foremost among the causes has been the high cost of pulpwood, due primarily to the decline in pulpwood resources available to mills and the necessity of obtaining from outside the State almost two-thirds of the pulpwood used. The decline in available resources has been caused in part by past negligence by forest owners which has lessened the productivity of much forest land. In addition, the constitutional prohibition of all cutting in the State Forest preserves—a consequence of past uncontrolled cutting—has made unavailable for commercial purposes about half of the pulpwood land in the State. . . . No evidence has been found that other items of cost, such as labor, power, and taxes, are generally higher in New York than in other competing states. In some cases, however, one or more of these items has been a contributing factor in decisions to build new mills elsewhere or to shut down New York mills. The effects of these items have been small compared with those of high raw material costs. . . . Relatively old and inefficient equipment is an important factor contributing to present high production costs in New York. This situation is largely a result of the shortages of wood and of high wood costs, which have discouraged the erection of new mills and major improvements in old ones."

In discussing how remedial measures could be applied, the analysis states in part: "A continued rela-

tive decline, and probably an absolute decline, may be anticipated in both pulp and paper production in New York after the conclusion of hostilities. . . . To halt the downward trend a marked decrease in the cost of pulpwood is necessary. Essential for such a decrease is an increase in forest resources available to pulp mills, although decreases in such items as forest taxes and cutting and hauling costs would be helpful. . . . To some extent, pulp mills can improve their own position. Those which own forest lands could, through more intensive forest management, increase future yields and lower average costs of wood grown. . . . Many paper mills could better their positions by concentrating production in those grades of paper where the disadvantage of high wood pulp prices is least serious. . . . Where concerns can seek out ways and means of assuring a continuing supply of raw materials, modernization of equipment provides an important method of curtailing costs and improving competitive position."

New Paper Container for Drugs

McKesson & Robbins, Inc., 3674 Third avenue, New York, N. Y., manufacturer of drugs and chemical specialties, has perfected a new compressed paper container for packaging its drug products and will use to replace metal containers in the future. In the past the company estimates that it has used about 1,357,000 pounds of metal for required containers, and this entire quota will now be made available for other service with the use of the new paper packages.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1942		Corresponding Weeks—1941	
October 31	93.0	November 1	108.6
November 7	89.9	November 8	105.0
November 14	89.6	November 15	107.0
November 21	87.5	November 22	105.3
November 28	83.5	November 29	107.7
December 5....(Prelim.)	*84.9*	December 6	106.9

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1941	85.6	89.7	92.2	96.0	98.7	99.3	94.2
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1941	101.0	99.7	105.2	106.2	100.4	97.4
1942	80.8	82.9	90.7	*87.2*	....	....

COMPARATIVE YEARLY SUMMARIES

	1935	1936	1937	1938	1939	1940	1941	1942
Year to Date..	69.8	80.0	82.1	71.4	82.8	86.0	97.2	*91.5*
Year Average.	69.9	80.4	79.8	71.5	83.4	85.6	97.4	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75
1938	56	63	63	60	60	59	59	60	70	73	67	61	64
1939	65	73	76	74	69	73	68	77	82	91	88	77	77
1940	78	75	74	76	82	85	77	79	78	85	82	77	78
1941	81	88	89	89	91	94	92	98	95	99	98	90	92
1942	102	101	101	95	82	72	68	75	76	81	82	..	..

Week ending Oct. 31, 1942—84
Week ending Nov. 7, 1942—84
Week ending Nov. 14, 1942—83
Week ending Nov. 21, 1942—83
Week ending Nov. 28, 1942—77
Week ending Dec. 5, 1942—82

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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"Lignasan" Reduces Washups. *Time and labor spent in washups and cleaning screens due to slime formation are reduced when "Lignasan" is used for slime control.*

IN unbleached sulfite pulp systems, where the slime problem is likely to be serious, good control is being obtained by adding "Lignasan" at the knotter screens or the rifflers. A solution is usually fed in at a rate of 4 ounces to 8 ounces of "Lignasan" per ton of fiber. The exact amount is dependent upon fiber content and severity of conditions.

In paper mills, "Lignasan" is used extensively as a beater treatment by applying it as a slug dose of 3 to 5 ounces per ton of fiber, dry basis. This has generally been found ample to control slime in beater chests, machine storage chests, machine head boxes, on screens and machine wires and in connecting pipes all the way from the beaters to the paper machine.

PULP PRESERVATION

To preserve laps, rolls or slush pulp, "Lignasan" is used in a range of from 4 ounces to 8 ounces per ton of fiber, dry basis. Laps usually are treated by means of a simple perforated pipe applicator, suspended above the wet machine. A control valve in the pipe connects it with a supply of "Lignasan" solution contained in an ordinary 50-gallon drum or barrel. The valve feeds solution at a rate to give the desired dosage.

To preserve slush pulp against deterioration by bacteria and fungi, "Lignasan" is mixed thoroughly with the stock, using a slug dose of 4 ounces to 6 ounces per ton of fiber, dry basis.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
Edited by R. G. Macdonald, Secretary

Paper Has Some New Packaging Jobs*

By Christopher W. Browne[1]

Substitute for Metals

The headlong current of destruction raging throughout the world is a major disturbance which creates countless minor whirlpools, each of which has the power to create other disturbances on its own hook. Packaging is in one of these whirlpools, and its disturbances are felt in hundreds of lines of business now called on to supply enormous quantities of everything for the hungry military machine and at the same time keep up as far as possible the supply lines for civilian needs.

The packaging progress of the past two or three decades is dramatically highlighted by the fast rushing events of today. In World War I, packaging was inadequate and inefficient. Really scientific packaging was not very far developed. There was terrific waste and spoilage of much needed goods. In this war, packaging is being given expert attention. Each shell has its individual carton; emergency rations are not only more edible than they were then, but they are packaged so that they remain so, whether they are sent to the tropics or the poles. Blood plasma was unheard of in the last war; now it is packaged and shipped all over the world, in many instances being dropped from airplanes. Foods for lend-lease shipments are dehydrated and packed in forms that occupy minimum shipping space, and they are protected from rough handling by modern and up-to-date packaging materials.

Meanwhile, if war supplies are to move as they should to the points where they are needed, then civilians must be content with packages which fall short of the perfection to which all of us as consumers have become accustomed. Perhaps we have been spoiled; possibly we have been educated to expect too much; and certainly current shortages prohibit maintaining the high standards which packaging has attained; but there is no doubt that all consumers will gladly give up packaging as usual for the sake of a quicker victory.

Watch the retail stores for the next few months, and you will witness what amounts to a packaging revolution. Today the shelves are still pretty well stocked with merchandise, most of which is in familiar packages. But that will not be the case very long. Metal packages will become fewer. Cigars and tobacco, hitherto packed in tin, will appear in paper or cardboard containers. Cigarettes have been out of foil for some time, and chocolate bars and chewing gum are rapidly following suit. Medicines that must be packaged in metal may continue that way, provided they are so unstable that they absolutely require such forms of packaging. Most dry products, however, will probably go to paperboard cartons, some of them with inner liners of paper which have a protective coating.

Glass Problems

Glass is plentiful, although—to conserve labor and productive facilities—the existing molds have been "frozen" and special molds have been restricted. So don't expect fancy and unusual bottles to be as plentiful as formerly. Manufacturers may no longer make blue glass, though amber is permitted. Lead is also forbidden in glassmaking, so it may be impossible to obtain the beautiful, sparkling, and expensive glassware when the present supply is exhausted.

Principal headache in connection with glass, however, is the closure problem. Metal closures have been severely restricted because of the demand for steel. Tin has been banned almost altogether for packaging purposes, except for prime essential foods and medicinals. Much of the black plate formerly tin-coated is appearing in new coatings and lacquers, and black plate itself has become tighter and tighter. These alternate materials will lack the silver-like luster which tin-coated metals had, and they will also be without their usual enamel colorings for the duration. Crown caps are being severely restricted. It is within possibility that carbonated beverages in bottles may be suspended if the war stretches out. Plastic caps may become more scarce and colored plastic closures will probably disappear until peace comes. Cork stoppers and liners are getting very scarce. Cellophane for decorative purposes and overwraps is out of the picture, though if a product can't be packed in anything but cellophane, it will be permitted—if it's an essential product. Rubber gaskets for jars will disappear and in their place will come synthetic coatings and linings—and no one will know the difference. But rubber sheetings which have appeared in so many forms will be banned except for hospital and sickroom supplies. Collapsible tubes may not change much in appearance, but they certainly will in materials. Tin, lead, and aluminum are so vital to the war program that eventually little or none will be used for making tubes for toothpaste and shaving cream. Instead, these products will be packaged in tubes made of paper or available plastic sheeting, with caps of available plastic. There are now in the research laboratories probably a dozen different substitutes for the

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Statler, Boston, Mass., Sept. 29-Oct. 1, 1942.

[1] Editor, Modern Packaging, 122 East 42nd St., New York, N. Y.

metal collapsible tube. So far only one of them has emerged from the laboratory stages and withstood the necessary tests, but the researchers are hard at work, and it won't be long now! Lipsticks and other cosmetics are beginning to appear in ingenious paper contrivances, their external appearance quite similar to previous packages. All luxury items will of necessity be packaged in a more prosaic manner—but milady will take them and like them.

Package Materials Status

That is the picture as you will see it where packages are found in greatest number and variety. Let's leave the store scene and go to the package maker's workshop for a roll call of the materials he uses, among which are these:

Tin	Very Short
Black plate	Very Short
Aluminum	Very Short
Metal foils	Very Short
Rubber compounds	Very Short
Phenol base plastics	Very Short
Urea-formaldehyde plastics	Supply plentiful but uses restricted
Cellulose sheeting	Restricted
Glass containers	Plentiful, but use threatened by closure situation
Wood	Some kinds getting tight, but use of all threatened by shortage of nails and transportation
Paper and paperboard	Plentiful, though production of some kinds may be curtailed to conserve man power, electric power, and transportation

What Paper Can Do

Thus anyone can see that paper must now carry a load which is many times greater than its usual burden. It must pinch-hit for all of these scarce materials. It must substitute for tin cans, for metal collapsible tubes, for plastic sheeting, for metal and plastic closures—it must perform miracles! Thanks to trained research men, technologists, and skilled technicians, it is doing just that. It is performing its new packaging jobs in a manner that will go down in history. It is demonstrating ability as well as availability. Here are some of the tests to which various papers must be subjected:

1. Inherent structural strength and rigidity
2. Wet strength
3. Moisture-vapor transmission
4. Oil resistance—to highly volatile oils as well as heavy lubricants
5. Light resistance.

But it isn't enough merely to test the package material in sheet form. The finished package must stand up, under rougher conditions than ever before, and the paper technologist's job isn't finished until it does. The situation presents a challenge both to the will and the capacity of the paper technologist.

Right here would be a grand spot to call names. But I'm pretty well fed up with the scolding type of speaker—either official or self-appointed—who gets up on the platform and tells his listeners that they don't realize there is a war on because they are so smug and complacent. I sometimes suspect that some of the name-calling is designed as a smoke screen to hide deficiencies. We of *Modern Packaging* Magazine sit in a spot where we get a pretty broad perspective on the entire scene, and in our judgment industry as a whole is doing a marvelous job in a situation that has upset so many customs and practices. By the same token — because of this overall perspective—perhaps we are in a position to see some of the ways in which various activities could be improved. Will you bear with me while I pass on to you some suggestions which I think will enable you to make a better contribution?

In the first place, it is probably unnecessary to remind you that today's emphasis is all on the utility functions of packaging—that is, protection and convenience. Our main interest in military packaging is to get the goods where they ought to go in usable condition, — at low cost, if possible, but economy is a secondary consideration; while appearance, color and design is relegated to the far background. In civilian packaging, the manufacturer is coming to the same point of view; he says "Give me something —anything—to put my product into so I can deliver it to my consumers." And those consumers are ready to accept packages of any kind, so long as they can get the goods. In fact, they are wondering why many articles made of scarce materials like rubber and the metals are still to be had in the stores. They don't always know that there is a long time interval between the factory and the retail store, and that manufacturers have been permitted to use up inventories on hand, but they are far better prepared to do without things than is commonly realized.

Those inventories are being used up—stock piles are dwindling rapidly. And that demands all possible speed in the development of substitute materials for packaging. Your true scientist, I know, doesn't like to be hurried, and normally he shouldn't be—but the times aren't normal. The need is desperate. We must speed up our experiments and accelerate our tests in every way possible. The forces we are battling won't wait on our convenience. The time is NOW!

And yet scientific accuracy must not be sacrificed. Some of us remember what the soldiers in the Spanish-American war called "desecrated beef"—which caused as many deaths as enemy bullets and eventually came under suspicion as being a product of crookedness. More of us recall the well-intentioned but inefficient packaging that caused losses in World War I. Scientific testing will do much to prevent recurrences of those things, and the research departments can check over the claims of the sales departments, to make sure that sales enthusiasm is properly tempered by scientific accuracy. Few salesmen would deliberately choose to misrepresent, but they aren't technologists as a rule, and if the technologist can show the salesman the value of a scientific attitude, it will help the present situation enormously and carry over into peacetime as well.

But it is possible for sincere scientists to have opposing points of view, and in normal times controversies are to be encouraged because that is one path to progress. But it's different today. We can't afford to magnify differences, some of which would be called hair-splitting by the practical man. I read a report the other way about a certain testing method, made by a man in a responsible position, in which he condemned the method though he stated in his report he had never used the equipment in question. As St. Paul says, *"My brethren, such things should not be."* Now, if ever, we must be open-minded, sympathetic, tolerant, and willing to credit the other fellow for motives as good as our own, and at the same time to take full advantage of his contributions.

A pattern is at hand, where just that has been done. Thirty manufacturers of fiber shipping containers have organized what has been called the "weatherproof fiber box group" for the sole and express purpose of working out improvements in the making of

their product to meet the tremendously increased responsibilities required by shipping containers in the present emergency. They have discarded competitive considerations altogether and have pooled information with a view to meeting the government standards and specifications for weatherproof cases. Products approved by the group may carry a symbol which has been adopted. During the months in which we have actually been at war, this group has been making excellent progress and has been able to set and meet more rigid standards than those established by the government. Quite likely further progress is yet to be made, when full reports about the performance of these boxes are received from our far-flung battleline. But this group deserves commendation. They are determined to find solutions for problems that must be solved because of the common danger.

What that group has done, others can do and count their efforts well spent, for there is much at stake. Grimly, ominously hanging over us is the issue of the war. We *can* lose it, in spite of the heroism of those at the front and the sacrifices of those at home. But that is an outcome unthinkable. We cannot wait for perfection in packaging material, for it may never come. We must do with what we can today, knowing that every effort we make will hasten the coming of peace.

And without a doubt, as a result of this coordinated effort, the paper industry will be in a stronger position after the war. Some of the services rendered by paper packaging will unquestionably be of a temporary nature, but there will be many permanent gains —which ones would be any man's guess now. Be that as it may, a plan for technical cooperation will prepare each participant for a better kind of competitive service when peace comes; but more to the point, it may help to avert disaster now.

New England TAPPI Discusses Selective Service

The New England Section of the Technical Association of the Pulp and Paper Industry met at the Roger Smith Hotel, Holyoke, Mass., on Friday, December 11th, 1942. Norman I. Bearse of the Champion-International Company, presided as chairman. There were about 70 present.

Hermon Barker reported that the Section has 150 paid up members. W, L. Foote reported that 877 registered at the recent national meeting in Boston, sponsored by the Section. There were 109 sponsoring companies.

R. G. Macdonald Commends Section

R. G. Macdonald, secretary of TAPPI, commended the Section and its co-sponsor, the Maine-New Hampshire Group, for its excellent work in organizing one of the greatest fall meetinps of the Association. He drew attention to the new TAPPI Bulletin and the opportunity it provides members of the Association and others to contribute directly to the war effort by supplying research data that will enable the industry to perform its great task of supplying adequate containers and wraps to replace the unavailable critical materials. Everyone was urged to send data to the Secretary regarding the greaseproof and moisture resistant papers and adhesives. The individual companies need to put intra industry competition to one side and aid the industry to make a real contribution toward winning the war.

Lt. Col. Roy C. Charron, C. W. S. Regional Field Officer of the Selective Service System, and Capt. R. A. B. Heap, Chief of the Labor Section Supply Board of the Springfield Ordnance Districts, talked on "The Government Manpower Policy and How New England Paper Mills Will Be Affected."

Col. Charron cited the National Defense Act of 1920 and traced the history of Selective Service to date., Speaking of the future he mentioned the new War Manning Table which will be of considerable importance. This provides for a listing, in various ways, of the skills in industrial plants. He pointed out that a large proportion of men under 36 will be taken into the armed services by a carefully worked out withdrawal schedule. These men must be replaced by women, men over 45 and physically handicapped workers. The Army, at present, has but from one-third to one-half of the skilled tradesmen that it needs. 242,000 new skilled workers will be needed in New England critical materials plants in 1943. The country will need about 5 million new workers.

Capt. Heap outlined the functions of his organization which is devoted to retaining highly skilled workers on their jobs and prevention of labor piracy. He indicated several examples of success in adapting women to industrial work. Sixty-three percent of British women are working in war plants. Plans are under way to utilize school children and their teachers for four-hour shifts. Some aliens and individuals with jail records will also be used. Employers are urged to use form 42A in requesting deferments. To meet labor requirements they are urged to use the U. S. Employment Service and to consult with the State Labor Director and the Army S. O. S. in regard to labor problems.

Nominating Committee Appointed

The Chairman appointed the following to serve on the Section Nominating Committee:

Milton J. Maguire, Hercules Powder Company; Bill Russell and Tom Flaherty, of the American Writing Paper Company, and G. H. Batchelder, of the Staley Sales Company.

Those in Attendance

Those present included: C. A. Anderson, H. T. Barker, R. F. Blount, P. S. Bolton, S. A. Brinnell, L. W. Crouse, H. E. Duston, K. I. Ekholm, Thomas Flaherty, W. L. Foote, L. D. Frisbie, J. W. Hagar, R. T. Hemhill, F. A. Johnson, Werner Kaufmann, Lena C. Kelley, P. J. Kennedy, Jr., H. S. Leonard, F. H Lovenberg, R. G. Macdonald, Milton J. Maquire, H. L. Mellen, Ernest O. Nash, Paul R. Nelson, H. A. Otto, John P. Phelps, E. A. Radant, E. O. Reed, W. G. Russell, F. W. Schneider, L. W. Smith, Harry P. Stedman, F. A. Strovink, G. W. Sullivan, A. Kenneth Warner, C. A. Weymouth and J. F. Wright.

Optical Characteristics of Paper as a Function of Fiber Classification

By Shirley R. Parsons[1]

Abstract

A study has been made of the effect of fiber dimensions on the optical properties of a paper sheet.

Under the conditions of this work, a given fraction of pulp scatters or absorbs light independently of its surroundings—i. e., the pulp fraction has the same specific scattering and absorption coefficient when mixed with other fractions as when alone. In certain cases, the fines from a pulp do not give results which agree with the above observation. In most cases apparently, this discrepancy can be attributed to a two-sided effect produced by the presence of a large amount of fines in the sheet.

The specific scattering coefficient of the fractions of a pulp, with the exception of the fines, is a linear function of the surface area.

Different fractions of a pulp may give sheets of varying densities even when pressed under the same conditions. In general, the larger the surface area of a pulp fraction the greater its density, and the greater this variation in density with surface area, the less the slope of the curve of the specific scattering coefficient against surface area.

With a groundwood pulp the specific scattering coefficient of all fractions, including the fines, is a linear function of the surface area. This indicates that, except for small changes in the absorption coefficient with surface area, the opacity depends directly on the fineness of the groundwood.

Groundwood has a lower specific scattering coefficient per unit surface area than any of the chemical pulps tested with a comparable sheet density. The higher specific scattering coefficient of chemical pulps with sheet densities comparable with those of groundwood is presumably caused by changes occasioned in these pulps by the pulping processes used. These changes may be in the nature of changes in the double refraction of the fibers or discontinuities in the fiber structure caused by the removal of incrustants.

Sheets made from a dried pulp have a greater light scattering power and opacity than those formed from wet-lap pulp. This increased scattering power may be the result of the poorer bonding qualities of such pulp.

Increased sheet density, whether occasioned by beating of the pulp or by increased degrees of wet pressing, gives decreased values of the specific scattering coefficient. Increased sheet density apparently causes the specific absorption coefficient to first decrease to a minimum value and then to increase.

In considering a study of the effect of fiber dimensions on the optical properties of a paper sheet, it is found that there has been very little fundamental work done. There is, to be sure, some general knowledge on this subject. For example, certain short-fibered pulps, such as hardwood soda and groundwood, are recognized as pulps of high opacity. However, other short-fibered pulps, particularly hardwood sulphite pulps, may have a low opacity, although their average fiber length may be as low as that of the hardwood soda pulp. This low opacity is explained by the fact that the degree of bonding between fibers greatly influences the opacity; the greater the degree of bonding between fibers, the lower the opacity. Hardwood soda and groundwood pulps have relatively poor bonding qualities and this factor, together with the short fiber length of such pulps, causes them to have a high opacity. The effect of the short fiber length of hardwood sulphites on opacity is offset to a certain extent by the better degree of bonding realized with these pulps. The effect of fiber bonding on opacity is well illustrated by the fact that the use of dry lap pulp or dry broke will impart opacity to a paper sheet.

The approach to a study of the effect of fiber dimensions on the optical properties of a paper sheet could be made in several ways. One way would be to take several pulps of widely different fiber dimensions and evaluate the optical properties of handsheets formed from these pulps. Pulps to be used in such a study would logically include rag, softwood bleached sulphite, hardwood bleached soda, and groundwood pulps. Such a method, however, is subject to criticism because in addition to variations in the optical effects produced by differences in fiber dimensions, there would be also the marked effect on the optical properties of differences in fiber bonding and other fiber properties resulting from the physical and chemical treatment of the various pulps. Another method would be to fractionate a given pulp and make optical measurements on handsheets prepared from the different fractions. Such a method would have the advantage that, except for possible slight variations in the bonding qualities of the different fractions, the variable under consideration would be that of fiber size alone. Maass *(1)* has published data which show that the short-fibered fractions of a pulp are more opaque than are the long fractions.

The method used in this study was to fractionate unbeaten pulps and evaluate the optical properties of the different fractions.

Theory of Optical Measurements

The use requirements of paper indicate that the two most important optical properties of a paper sheet are opacity and brightness. Both of these quantities are commonly evaluated by means of reflectance measurements. Harrison *(2)* has summarized the various relationships that have been developed in the mathematical treatment of the light reflectance and transmittance of translucent materials. The most important of these equations are those of Ryde *(3)*, Gurevich *(4)*, and Kubelka and Munk *(5)*. These

A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1941. This work was done under the guidance of J. A. Van den Akker.

[1] Consolidated Water Power & Paper Company, Wisconsin Rapids, Wis.

equations relate the reflectance of thin layers of a homogeneous material to fundamental quantities.

The equations of Kubelka and Munk are the most readily applicable to practical measurement, because these investigators carried out their derivation in such a way that the quantities measured are simple reflectance measurements. The application of the Kubelka and Munk equations to paper has been studied by Steele *(6)* and Judd *(7)*. By means of these equations the diffuse reflectance of a paper sheet may be expressed in terms of two fundamental quantities, the scattering coefficient *(S)* and the absorption coefficient *(K)*.

S, the scattering coefficient, is defined as the limiting value of the relative light energy per unit thickness scattered backwards from an imaginary layer of a material as the thickness of the layer becomes very small. *K*, the absorption coefficient, is defined as the limiting value of the relative absorption of light energy per unit thickness as the thickness of an imaginary layer of the material becomes very small.

The scattering and absorption coefficients are characteristic of the pulp fibers making up a sheet. Simple changes in a sheet, such as variations of the basis weight, would have little effect on these coefficients. It is this fact that makes these coefficients, particularly the scattering coefficient, of value in predicting changes of opacity with changes of basis weight.

A useful equation of the Kubelka and Munk theory is:

$$K/S = (1 - R_\infty)^2/2R_\infty,$$

where R_∞ is the reflectivity, or reflectance of an opaque pad of sheets. From this relation, the ratio of *K* to *S* may be evaluated by a simple reflectivity measurement. Other equations permit the calculations of charts by means of which *S* and, subsequently, *K* may be evaluated. Two reflectance measurements are necessary in the evaluation of *S* and *K*. In the Bureau of Standards reflectance-opacity chart, the two reflectance measurements are those of R_∞ and R_0, where R_0 is the reflectance of a single sheet backed by a material of zero reflectance. This chart has values of R_0 as ordinates and values of $C_{.89}$, or TAPPI opacity, as abscissas. The constant R_∞ lines have positive slopes and the constant *SX* lines have negative slopes. Knowing the values of R_0 and R_∞ for a paper sheet, the *SX* value may be read from the chart. The *SX* value may then be divided by *X*, the thickness, and the *S* value obtained.

The *SX* value is the scattering power of the sheet and is a pure number having no units. For a given value of reflectivity the opacity depends upon the value of *SX*. Obviously, the quantity *SX* depends upon the thickness of the sheet and, therefore, this quantity is a sheet property. The scattering coefficient, *S*, is a property of the substance of the finished paper.

In the evaluation of *S* the *SX* value is divided by *X*, the thickness of the sheet. This gives the *S* value of the furnish as it exists in the sheet. However, in certain cases such an evaluation of *S* is useless. An example is a dry paper sheet, with a high bulk and a certain *SX* value, which is compressed (while dry) to one half of its original thickness. (It is assumed that the compression is accomplished by a static pressure that does not affect the internal bonding of the sheet in contrast to a shearing pressure, such as in a calendering operation.) With the dry sheet there is no appreciable increase in fiber bonding upon compression and so the *SX* value of the compressed sheet is very nearly the same as for the uncompressed sheet. The caliper is half as great and, therefore, the *S* value will have been doubled. This is explained by the fact that there are double the number of scattering particles per unit thickness in the compressed sheet. The fact that the *S* value of the furnish has been doubled in an operation that has not changed the opacity of the sheet shows that this evaluation of *S* is rather useless. If, in this case, the *SX* value had been divided by the basis weight of the sheet, the "S" value obtained per unit areal weight of the furnish would have been the same before and after compression. Such an evaluation of "S" would seem more meaningful, because the optical properties of the paper sheet were not changed by the compression. More fundamentally, and more generally, this evaluation is to be preferred because it gives a result proportional to the scattering power of the particles making up the sheet. Such a procedure might be considered as not being strictly correct mathematically because *X* is properly the thickness. However, the incorrectness arises in dividing *SX* by the basis weight and *calling the result S*. Properly, if *SX* is divided by the basis weight, expressed as *W*, the value *SX/W* is obtained. This gives an expression of the scattering power per unit areal weight of sheet, which should be more useful in most cases than an expression for the scattering power per unit thickness.

It was decided to evaluate the scattering power of the pulps by this means. Since the quantity *SX/W* should not properly be called the scattering coefficient, the designation "Specific Scattering Coefficient" and the symbol *S'* will be used for it. Corresponding to the value, *S'*, will be the "Specific Absorption Coefficient," *K'*, obtained by multiplying *K/S* by *S'*.

It is clear that, in the absence of appreciable optical contact, the following useful equation holds:

$$S' = SX/W = (S'_1W_1 + S'_2W_2 + S'_3W_3 + \ldots\ldots\ldots)/W.$$

This equation shows that the specific scattering coefficient of a sheet is equal to the weighted average of the *S'* values of the components.

Materials and Methods

Pulps used

The pulps used included a bleached spruce sulphite, bleached hardwood soda, two jack pine kraft pulps in different stages of bleaching, groundwood, and a bleached poplar sulphite pulp. The spruce sulphite and the soda pulp were in dry lap form; the kraft pulps, the groundwood, and the poplar sulphite were received in wet form with from 70 to 75% water. The groundwood was received just prior to use and so needed no storage. The kraft pulp and part of the poplar sulphite pulp were stored and used in the wet condition. To preserve these pulps, they were sprayed liberally with a 1% solution of sodium pentachlorophenate and stored in air-tight containers. Part of the poplar sulphite was air dried and stored in paper bags.

Fractionation of pulps

In the fractionation of a pulp which is to be used for optical measurements, the effect of impurities in the water used on the brightness of the pulp is of great importance. Softened water was used in these fractionations. The water was softened in a Permutit "De-Acidite" system, which is a two-unit system, the first unit being a hydrogen zeolite base-exchange unit and the second, an acid-absorbing unit. The water passing through this system also passed

through an activated carbon filter, which was a third unit that was added to remove a pinkish color in the water coming from the softener. This series of treatments provided a water which was considered sufficiently pure for the purposes of this investigation.

Before the pulps were fractionated they were disintegrated in the British disintegrator, using 90 grams of dry pulp in two liters of water. Dry lap pulps were soaked for at least three hours in water and broken up with 25,000 revolutions. Pulps in wet form were soaked in water for a short while and broken up with 12,500 revolutions in the disintegrator, with the exception of groundwood, which was disintegrated with 7500 revolutions.

The fractionation of the pulps was carried out in a Bauer-McNett fiber classifier, provided with 20, 35, 65, and 150-mesh screens. The standard procedure adopted was as follows: The equivalent of 10 grams of moisture-free pulp in completely defibered form was added to the first compartment of the classifier with the stirrers running, and with water passing through at a rate of three gallons per minute. The time of fractionation was 15 minutes. The contents of each compartment were then drained and the fibers caught on a muslin cloth.

The pulps used contained varying amounts of fine material which would pass the 150-mesh screen (designated as "fines"). Because it was desired to study these fines, provision had to be made to collect them. The obvious way to do this would be to collect all of the water that passed through the classifier and filter it on a fine mesh muslin cloth. However, in the filtering operation a large amount of water passes through a small quantity of the fines and any dirt in the water will be picked up by the fines. For this reason, methods were used in the separation which avoided contact of the fines with excessively large quantities of water. With hardwood pulps or with groundwood—pulps containing a large quantity of fines—the method involved the collecting of the water passing through the classifier during the first half of the fractionating operation and allowing it to stand. (Most of the fines would have passed through the 150-mesh screen during this time.) After the fines had settled out, the supernatant water was siphoned off and the concentrated fines filtered on a muslin cloth. In the case of a softwood pulp which contains a small percentage of fines, the original pulp was given a preliminary separation process by running a suspension of the pulp over an inclined 90-mesh screen. The water and fine fibers passing through this screen were collected and the fiber allowed to settle. The excess water was siphoned off and the concentrated fiber suspension thus obtained contained a large proportion of fines. This fiber suspension was then run through the classifier and the water passing through the last screen was collected. The fines were allowed to settle and finally separated by filtration. In this way fines were collected which were clean and had apparently received little if any contamination from the water.

Preparation of handsheets

In the experiments in which the optical characteristics of different pulp fractions were investigated, it was desired to mix together different fractions of a pulp in definite proportions and to measure the S' and K' values of sheets formed from such mixtures. This of course necessitated that there be no fiber loss in the sheet-forming operation. The standard method of forming handsheets on the British sheet mold could not be used, because of the small fiber loss through the wire.

The method adopted for handsheet preparation was to form the sheets on a silk cloth placed over the wire of the British sheet mold. Tests showed that there was no fiber loss in this operation. Softened water was used and the standard sheetmaking procedure (TAPPI Standard T 205 m-40) was used with the following exceptions. The sheet was couched with a filter pad in immediate contact with the sheet. After couching, the silk cloth was removed from the sheet and another filter pad placed in contact with the wire side of the sheet. A metal disk was then placed over this to facilitate lining up the handsheets in the pressing operation and to aid in storing of the sheets for drying. Both sides of the sheets thus formed had a matte surface rather than one glossy and one matte surface, as in the case of a handsheet pressed and dried with a metal plate in contact with one side. The reason for desiring a matte surface on both sides of the sheet was that such a sheet would be more homogeneous throughout its entire thickness than would a sheet with one glossy surface.

It was found that sheets could not be satisfactorily prepared from the fines by the above procedure because, after formation, they adhered to the cloth so strongly that they could not be removed. The handsheets from the fines and from all the fractions of the groundwood pulp were formed on a filter pad in a 6-inch Büchner funnel.

In experiments on the effect of beating and varying the degree of wet pressing on the optical properties of a paper sheet, it was permissible to have a small fiber loss. In these cases, the handsheets were formed directly on the wire of the sheet mold by the standard procedure.

Area measurements on pulp samples

The scattering coefficient of a pulp is influenced by such factors as particle size and shape, the degree of bonding between fibers, and the indices of refraction of the fibers. The absorption coefficient is influenced to some extent by the degree of bonding between fibers and the indices of refraction of the fibers, but to a much greater extent by changes in the bleaching or the dyeing of a pulp. The fractions of any one pulp, with the exception of the fines, would be expected to have about the same degree of bonding between fibers when formed in a paper sheet, and also the indices of refraction of these fractions should be nearly alike. Any changes in the scattering coefficient of the different fractions, with the exception of the fines, could then be explained by differences in the fiber dimensions. Any variation in the absorption coefficient of various fractions would be due in the most part to differences in the degree of purification of these fractions and would not have any direct relationship to the particle size.

The scattering coefficient depends more on fiber area than on fiber length alone. It was therefore considered desirable to study the relationship between fiber area and the specific scattering coefficients of different pulp fractions. Although a microscopic measurement of length and width could be used for this purpose, fibers vary widely in the shape of their cross sections and, therefore, this type of measurement is only approximately correct, because the shape of some fiber cross section must be assumed in calculating the fiber area.

A rapid method for the routing determination of the surface area of pulps is available through the

"specific surface measurement" as developed by Clark *(8)*; modifications of the original procedure have been made by McEwen *(9)*.

In Clark's method the fibers are coated with a uniform layer of silver and the area of this silver coating determined. The measurement of the area of silver coating depends upon the fact that hydrogen peroxide is catalytically decomposed when in contact with a silver surface. This reaction is presumably a first order reaction and a measurement of the rate of reaction will thus give a measure of the total area of silver. The method adopted by Clark *(8)* for the measurement of the rate of reaction was to determine the amount of hydrogen peroxide decomposed by a silvered pulp sample in a definite time (100 seconds). In an attempt to obtain an absolute value for specific surface of fibers a calibration curve was made. The amount of hydrogen peroxide consumed in this determination when small squares of cellophane of known area were silvered and treated with hydrogen peroxide under the standard conditions of the determination was used as the basis for the construction of this calibration chart. The construction of this chart is described by Clark *(8)*. The actual procedure used in the determinations was the modified procedure as given by McEwen *(9)*.

Effect of Beating on Optical Properties

One experiment was made to determine the effect of beating on the optical properties of a paper sheet. The spruce sulphite pulp was used in this experiment. Since the optical properties of a paper sheet would be affected by the probable increase in ash content of pulp when beaten in a laboratory beater or pebble mill, it was decided to carry out the refining treatment in a Lampén mill. Treatment of pulp in such a mill offers the minimum of contamination to the pulp of any refining equipment available. Pulp samples were treated in this mill for intervals of 15, 30, and 60 minutes.

As mentioned previously, the sheets involved in the beating studies were formed directly on the wire of the British sheet mold by the standard procedure. The following deviations were made from the standard procedure in the couching and pressing operations. The sheets were couched with a filter pad in direct contact with the handsheet. In the pressing operation one set of sheets from each interval was pressed with a filter pad in contact with both sides of the sheet so that both sides had a matte surface. Another set of sheets from each interval was pressed with a filter pad in contact with the top side and a metal plate in contact with the wire side of the sheet. This gave a sheet with one glossy and one matte surface. The purpose of this was to show the effect of a glossy surface on the optical properties.

One experiment was made to show the effect of variations in wet-pressing pressures on the optical properties of a paper sheet. Sheets were prepared from the spruce sulphite pulp by the standard procedure and were pressed with a filter pad in contact with each side of the sheet. Pressures of 10, 50, 200, and 5000 pounds per square inch were used in the pressing of these sheets. The sheets that were pressed at 50 pounds per square inch were used for the zero interval in the beating experiment.

Reflectance Measurements

The General Electric recording spectrophotometer was used to make reflectance measurements on the samples. This instrument has been discussed in detail by Hardy *(10)*. By means of this instrument a reflectance curve for the sample could be obtained for all wavelengths of visible light from 400 to 700 mμ. In these measurements the ultimate standard of reflectance was magnesium oxide, which is known to have an absolute reflectance of 0.97. For practical purposes calculations were made from reflectance values taken only at a limited number of wavelengths—420, 500, 600, and 700 mμ.

In making the reflectance measurements the sheets were cut into small tabs which would fit conveniently over the sample opening of the spectrophotometer. The reflectance measurements were those of R_o, for which the backing was a cavity lined with black velvet and of R_∞ the reflectance of the sheet backed by an opaque pad of sheets. The average values of R_o and R_∞ were multiplied by 0.97 to obtain absolute reflectances and these values were used to obtain SX from the Bureau of Standards reflectance-opacity chart.

Experimental Results

Pulp Fractions

The specific scattering and absorption coefficients were evaluated for the fractions of six different pulps. The pulps and the numbers used in their designation are as follows:

Number	Type of Pulp
5 & 6	Bleached spruce sulphite
7	Bleached poplar sulphite—dry lap
9	Bleached hardwood soda
10	Fully bleached jack pine kraft
11	Lightly bleached pack pine kraft
12	Spruce groundwood

The mesh size of the screen upon which the various fractions of the pulps were retained was used to designate these fractions. For example, Fraction 7-20 would refer to that portion of the bleached poplar sulphite pulp that was retained on the 20-mesh screen of the classifier.

The screen retention of the various pulps is shown in Table I.

TABLE I.—SCREEN RETENTION OF PULPS

Sample	on 20 mesh %	on 35 mesh %	on 65 mesh %	on 150 mesh %	Fines %
5	70.9	12.2	8.04	3.82	5.00
6	70.8	12.5	7.66	4.18	4.82
7	7.54	34.0	31.0	14.8	12.7
9	4.33	23.7	41.5	9.45	21.1
10	66.0	18.2	8.47	2.27	5.10
11	68.0	17.4	7.60	3.40	3.60
12	0.52	10.1	20.9	21.2	47.3

Effect of Fractionating Process on Optical Properties

Optical measurements were made both on isolated fractions of pulps and on handsheets prepared from mixtures of fractions. For each pulp that was fractionated, one mixture was prepared from the fractions recombined in the same proportions as they existed in the original pulp. These sheets were labelled "A". Sheets were also prepared from the original pulp and were labelled "O". If no dirt had been picked up by the pulps during the fractionations the optical properties of sheets "A" and "O" should be alike. Table II shows the values of R_∞, S', and K' at 600 mμ wavelength of these particular handsheets for all of the pulps.

In the case of a pulp which contained a large percentage of fines it is seen that the reflectivity of a sheet made from the recombined fractions was appreciably lower than that of sheets made from the original pulp. This is particularly true in the case of the groundwood which contained nearly 50% of

TABLE II.—EFFECT OF FRACTIONATING PROCESS ON OPTICAL PROPERTIES

Sample	$R\infty$	$S' \times 10^4$	$K' \times 10^6$
5-O	0.865	556	583
5-A	0.875	541	483
6-O	0.899	582	330
6-A	0.894	586	366
7-O	0.877	589	509
7-A	0.877	598	517
9-O	0.869	829	818
9-A	0.854	835	1040
10-O	0.836	401	646
10-A	0.822	371	716
11-O	0.800	384	960
11-A	0.798	391	1000
12-O	0.788	971	2770
12-A	0.758	903	3490

fines. This fact would indicate that the fines picked up a small amount of dirt in the fractionations. In the case of pulps that contained a small percentage of fines, it is seen that the reflectivities of the two types of sheets are nearly alike. This would indicate that, with the exception of the fines, the fractions of pulp had picked up little, if any, dirt during the fractionations.

Variation of Optical Properties with Wavelength of Light

Table III shows the variation of $R\infty$, S', and K' with wavelength of light. The data are for sheets made up from the unfractionated spruce sulphite pulp.

TABLE III.—VARIATION OF $R\infty$, S' AND K' WITH WAVELENGTH

(Unfractionated Spruce Sulphite Pulp)

Wavelength mμ	$R\infty$	$S' \times 10^4$	$K' \times 10^6$
420	0.808	659	1505
500	0.877	612	528
600	0.899	582	330
700	0.889	548	379

The variation of the reflectivity and specific absorption coefficient with the wavelength of light is associated with the color of the pulp. Pulps, in general, have a slight yellowish color and, therefore, would have a high absorption coefficient in the lower end of the light spectrum.

The decrease of the specific scattering coefficient with increasing wavelength of light may be due to one of two things. As shown by Frey-Wyssling (*11*), the indices of refraction of cellulose fibers show a slight decrease with increasing wavelength of light. The decrease in the axial index of refraction of ramie fiber is from 1.6083 at 486 mμ to 1.5969 at 656 mμ. It does not seem probable that such a small change would account for the relatively large change in S' shown above. Another explanation for the decrease of S' with the longer wavelength of light is that some scattering of light may take place within the fiber. If this is so, the Rayleigh law of scattering would hold here, in part at least, since the particle size of structural units within the fiber are of the same magnitude as the wavelength of light, or smaller. The Rayleigh law states that the intensity of light scattered from particles smaller than the wavelength of light varies inversely with the fourth power of the wavelength.

Additive Property of S' and K'

Handsheets were prepared from mixtures of various fractions of pulp in order to determine if the S' and K' values of a pulp fraction are the same when used alone as when mixed with other pulp fractions. The composition of sheets labelled "A" are the same as that of the original pulp. The composition of other mixtures is shown in Table IV.

Table V contains data on the specific scattering and absorption coefficients of different mixtures of

TABLE IV.—COMPOSITION OF SAMPLES PREPARED BY MIXING TWO OR MORE FRACTIONS

Sample	Fraction 20 %	35 %	65 %	150 %
5-B	74.6	12.8	8.46	4.04
5-C	85.0	15.0	....	....
5-D	90.0	....	....	10.0
5-E	....	51.2	32.8	15.9
9-B	5.48	30.0	52.5	12.0
10-B	69.5	19.2	8.9	2.4
11-B	70.6	18.1	7.9	3.5

pulp fractions at 600 mμ wavelength. The values labelled "Observed" are the values actually obtained for handsheets made from the various combinations of pulp fractions. The values labelled "Calculated" are those obtained by taking the S' or K' value for each fraction of pulp in the mixture, multiplying this value by the percentage of that fraction in the mixture, adding together the products thus obtained for each fraction, and dividing by 100.

TABLE V.—TEST OF THE ADDITIVE PROPERTY OF S' AND K'

Sample	$S' \times 10^4$ Obs.	$S' \times 10^4$ Calc.	$K' \times 10^6$ Obs.	$K' \times 10^6$ Calc.
5-A	541	542	483	978
5-B	550	551	339	314
5-C	535	536	316	283
5-D	541	545	333	322
5-E	635	614	432	425
6-A	586	576	366	470
7-A	598	538	517	734
9-A	835	814	1014	1478
9-B	733	744	758	732
10-A	371	385	716	761
10-B	409	397	565	515
11-A	391	392	1000	1160
11-B	385	401	1020	1013
12-A	903	1020	3490	4270
Mixture A	468	459	693	729
Mixture B	775	747	2380	1600
Mixture B'	669	747	2710	1600

Mixture A was a 50-50 mixture of bleached spruce sulphite and the lightly bleached kraft.

Mixture B was a 50-50 mixture of bleached spruce sulphite and groundwood. This gave a two-sided sheet. B and B' refer to the same sheet with the reflectance measurements made with the light incident on the top and the wire side of the sheet, respectively.

The S' and K' values of the individual fractions of pulp are given in Table VI.

It is seen from the above data that there is a good agreement between the calculated and observed values of S' and K' for mixtures of pulps and pulp fractions. It is also seen that, in general, this agreement is better for sheets that were made up without fines. The occasional discrepancy between observed and calculated S' and K' values of sheets containing a large proportion of fines is discussed below. It is apparent that, with exceptions as noted below, the S' and K' values of mixtures of pulps or pulp fractions are additive.

Effect of Two-Sidedness in a Sheet on Optical Properties

It is seen in Table V that with certain mixtures of pulps or pulp fractions the agreement between the observed and calculated values of S' and K' is not very good. This is particularly true in the case of Samples 5-A, 7-A, 12-A, and Mixture B. That these discrepancies may be due to a two-sided sheet, resulting from the presence of a large amount of fines in the sheet, is shown by the data from mixture B, which was a mixture of sulphite and groundwood pulps. With this sample there are large differences in the observed values of S' and K' depending on which side of the sheet was exposed to the light in the reflectance measurements. The high K' value obtained when the wire side of the sheet was incident to the light indicates that the largest proportion of the groundwood was on the wire side of the sheet, since the groundwood had the higher specific absorp-

tion coefficient of the two pulps in the mixture. (As a general rule, laboratory sheets have a lower reflectance on the wire side, whereas machine-made paper generally exhibits an inferior reflectance on the felt side—a difference undoubtedly to be attributed to the draining and washing action of the table rolls, and to the sucking action of the suction boxes.) The groundwood also had the higher S' value of the two pulps and thus it might be expected that the higher S' value would be observed with the wire side of the sheet toward the light source. The data show the opposite to be true.

From these observations it would be concluded that the Kubelka and Munk equations do not hold too well in the case of a nonhomogeneous sheet.

In the case of sheets containing a large amount of fines a two-sided effect might explain the difference between observed and calculated values of S' and K'. However, reflectance measurements made on Samples 7-A and 9-A gave values that were practically identical for either side of the sheet, indicating that the effect of two-sidedness does not explain the difference in the observed and calculated values of S' and K' for these two samples.

Variation of S' with Surface Area

In Table VI are given values for the apparent density, S', and K' of sheets made from the different pulps and pulp fractions together with their specific surface.

Davis (*12*) has stated that the scattering coefficient should be proportional to the specific surface per unit mass of the material. On the basis of this statement it was considered of interest to plot S' against the specific surface of the different fractions and study the resulting curves.

The curves for the two sulphite pulps are shown in Fig. 1, and those for the remaining pulps in Fig. 2. It is seen that the values for all fractions of any one pulp, with the exception of the fines, fall on the same straight line. A criticism might be directed at drawing a straight line through the points for all the pulp fractions with the exception of the fines and not allowing the value for the fines to influence the shape of the curve. However, cognizance of the nature of the sheets made from the fines justifies the construction of the curves as shown in the two figures. These sheets were quite dense and gave

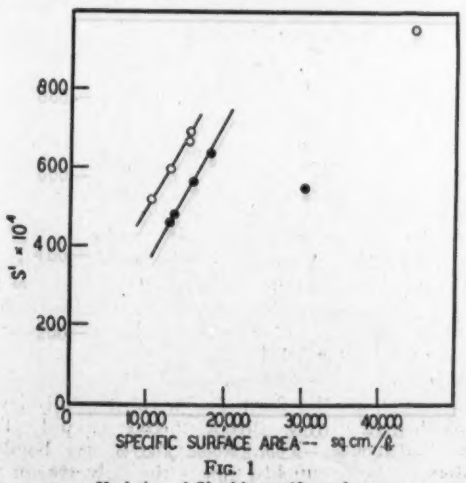

Fig. 1

Variation of S' with specific surface
O Pulp 6 ● Pulp 7

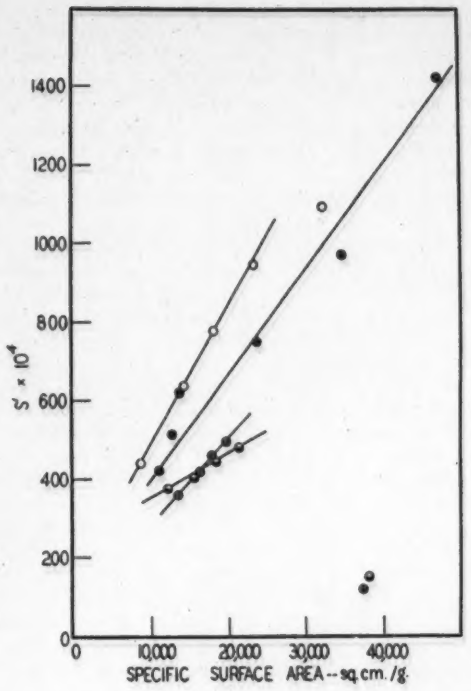

Fig. 2

Variation of S' with specific surface
O Pulp 9 ⊕ Pulp 10
● Pulp 11 ● Pulp 12

every other indication of optical contact between the particles, the latter accounting for the lower specific scattering coefficient of the fines.

The data for the groundwood samples are the least accurate of any obtained. One reason for this is the difficulty of obtaining accurate SX values because of the small difference between R_0 and R_∞ for

TABLE VI.—DENSITY, SPECIFIC SURFACE, AND SPECIFIC SCATTERING AND ABSORPTION COEFFICIENTS FOR PULP AND PULP FRACTIONS

Sample	Apparent density*	Specific surface sq. cm./g.	$S' \times 10^4$	$K' \times 10^4$
6—0	8.94	13,000	582	330
6—20	8.30	10,600	528	241
6—35	8.56	13,900	601	294
6—65	8.65	15,200	670	306
6—150	8.83	15,400	697	502
6—fines	9.56	44,000	966	4530
7—0	9.78	18,340	589	509
7—20	9.66	12,700	465	316
7—35	9.47	13,300	484	206
7—65	9.48	15,900	585	272
7—150	10.3	17,900	646	352
7—fines	12.1	29,500	486	3980
9—0	7.78	20,500	829	818
9—20	6.75	8,700	452	653
9—35	6.00	14,600	641	664
9—65	7.31	18,300	783	748
9—150	8.60	23,900	955	867
9—fines	9.17	32,200	1080	5590
10—0	11.0	15,500	401	646
10—20	10.6	13,900	380	490
10—35	11.2	16,200	422	536
10—65	11.6	17,700	454	573
10—150	12.4	19,300	495	787
10—fines	17.4	38,000	138	5360
11—0	11.3	14,900	384	960
11—20	10.5	12,600	388	992
11—35	11.2	15,600	413	1020
11—65	11.8	18,200	442	1080
11—150	12.2	20,900	476	1230
11—fines	17.2	38,400	155	5000
12—0	7.14	34,200	971	2770
12—20	4.96	11,400	432	2180
12—35	5 52	12,500	522	1920
12—65	5.91	13,900	634	2160
12—150	6.60	24,100	766	2680
12—fines	8.66	47,400	1430	6590

*The values for apparent density were obtained by dividing the basis weight (pounds per 25 x 40—500 ream) by the caliper in mils.

the rather opaque sheets formed from the finer fractions of the groundwood. Also, it was difficult to obtain accurate area measurements on the fine fractions of the groundwood because of the tendency of these fractions to lump together. The curve for the groundwood fractions may be slightly misplaced but in consideration of the above it would seem proper to draw a straight line through the points for the groundwood fractions as was done for the chemical pulps.

It is seen in the case of the fines from the groundwood that the point fell on the curve, whereas the corresponding point for the other pulps was usually far from the curve. This is apparently to be explained by the fact that the fines of groundwood are quite different from those of a chemical pulp. In groundwood the fines are made up of a fine material or debris which is the result of comminution in the grinding operation and which has no definite structural form. The fines from a chemical pulp contain some structureless debris resulting from mechanical treatment of the fibers, but they also have a large proportion of the ray cells of the wood. It is possible that, in the fines from a chemical pulp, a substance is present which is optically different from the coarse fractions of the pulp. Ritter and Mitchell *(13)* have published data showing that the behavior of basswood holocellulose ray cells in polarized light is different from that of the fibers. The vibration plane of the slow light component in fibers is parallel to the long axis, whereas the opposite is true in the case of the ray cells. Fines containing a large proportion of ray cells, therefore, might exhibit a behavior different from that of the coarse fractions of a pulp. This would account, in part, for the very low S' values of the fines from the kraft pulps, although it is equally possible that this is due to the high density of sheets formed from these fines.

In addition to the above, it should be noted that the fines from groundwood formed a sheet that differed little from those prepared from the other fractions. In the case of the chemical pulps the sheets made from the fines were usually dense, "tinny", and brittle.

It is seen that the slopes and height of the curves for the various pulps are quite different. It would be reasonable to believe that these differences are caused by variations in the sheet density of the different fractions but analysis of the data disproves this. For example, the groundwood fractions have the lowest density of any of the pulp fractions and, hence, for a given specific surface it would be expected that they would have the highest specific scattering coefficients. The data, however, show that for a given specific surface the groundwood has a lower S' value than either the spruce sulphite or the hardwood soda pulp.

In the case of the chemical pulps it was thought that it might be possible to develop an empirical relation between fiber area, sheet density, and the specific scattering coefficient. However, it was not possible to develop a general equation that would hold for all the pulps.

From a study of the curves and the data on apparent densities of the pulp fractions it is obvious that, in general, the greater the increase in apparent density with increasing specific surface, the less steep the slope of the curves. Samples 10 and 11, in particular, show rapid increases in apparent density with increasing specific surface and it is these samples which have the curves of least slope. The fractions of Sample 11 show a slightly larger increase in apparent density with specific surface than do the fractions of Sample 10, and it is seen that the curve for Sample 11 has a lesser slope than that of Sample 10. These results are what would be expected, for with increased sheet density there is an increased degree of optical contact between fibers and particles and, hence, a lowered value of S'.

The fact that groundwood has the lowest sheet density of any of the pulps, which would tend to give it a very high specific scattering coefficient per unit specific surface, together with the fact that it has a lower scattering coefficient per unit specific surface than either the soda or the spruce sulphite pulps, might be used as a basis for reasoning that, in the pulping of wood, changes occur in the fiber structure which increase the scattering coefficient of the fibers. Such changes would be discontinuities in the fiber structure, or changes in the double refraction as mentioned by Kanamaru *(14)*, caused by the removal of incrustants during the cooking process.

The opacity of a pulp is related to both the K' and S' values. Except for the fines, the K' values of the various fractions of groundwood were nearly alike. Probably the fines had picked up some dirt or coloring matter in fractionation, because their specific absorption coefficient is very high as compared with that of the original pulp. Since the specific scattering coefficient is seen to be a linear function of the specific surface, it is apparent that, except for a displacement due to a possible high absorption coefficient of the fines, the opacity of the groundwood is a direct function of the specific surface. This same reasoning holds true within limits for the chemical pulps, but in these cases there is no opportunity to vary the particle size (except as to fiber length) as can be done with groundwood. Table VII gives values of the specific surface of the groundwood, and printing opacity of groundwood handsheets at 600 mμ wavelength, obtained by dividing R_o by R_∞ for this wavelength.

TABLE VII.—RELATION OF SPECIFIC SURFACE TO OPACITY FOR GROUNDWOOD FRACTIONS

Fraction	Wavelength—600 mμ Specific surface sq. cm./g.	R_o/R_∞ %
12—20	11,400	79.8
12—35	12,500	85.0
12—65	13,900	87.4
12—150	24,100	91.1
12—Fines	47,400	98.8
12—0	34,200	92.6

The preceding data clearly show the high opacity obtained with the fine fractions of groundwood.

Effect of Using Dried Pulp on the Optical Properties of Paper

One experiment was carried out to illustrate the effect on optical properties of drying a pulp. The bleached poplar sulphite pulp was available both in wet-lap and in air-dry form.

The data for Sample 7-0 serve as the results for the air-dry pulp. A sample of the wet-lap pulp was disintegrated and formed into sheets in exactly the same manner as were sheets from the dried pulp. The necessary reflectance and basis weight measurements are shown in Table VIII.

The greatly increased value of S' for the dried pulp is apparent; the sheets had a substantially lower density than those formed from the wet-lap pulp. This means that the dried pulp had the poorer bonding qualities, and presumably this is the only reason for the higher S' value of the dried pulp. The K' value

TABLE VIII.—DIFFERENCES IN OPTICAL PROPERTIES OF SHEETS FORMED FROM DRIED AND WET-LAP PULP
Wavelength—600 mμ

Sample	Basis weight 25 x 40 —500	Apparent density	R_o	R_∞	$S'x10^4$	$K'x10^6$	R_o/R_∞
Sheet formed from wet-lap pulp...	46.7	12.8	0.654	0.846	432	605	77.3
Sheet formed from dried pulp.....	44.2	9.56	0.710	0.877	589	509	81.0

for the sheet made from the wet-lap pulp is seen to be higher than that of the sheet formed from the dried pulp. This is more than likely caused by a reversion in brightness of the wet-lap pulp, which is shown by the lower R_∞ value of the sheet formed from this pulp.

The opacities (R_o/R_∞) of the two sheets are not directly comparable because of their difference in basis weight. The sheets formed from the dried pulp had the lower basis weight and, if the opacity values had been corrected to the same basis weight, the difference would have been greater than that indicated in the table. The increase in S' and opacity resulting from the use of pulp that had been air dried is surprising. The increase in opacity illustrates clearly the reason for using dry-lap pulp or dry broke to impart opacity to a paper sheet.

Effect of Beating and Variation in Pressing on Optical Properties of Paper

The results of a beating experiment are given in Table IX.

Sheets A were pressed with a metal plate in contact with one surface of the sheet giving a glossy surface, whereas Sheets B were pressed with a filter pad in direct contact with both sides of the sheet so that they were matte. Bleached spruce sulphite pulp was used.

TABLE IX.—EFFECT OF BEATING ON OPTICAL PROPERTIES
Optical measurements at 600 mμ

Beating Interval—min..		0	15	30	60
Freeness—cc. S-R.		835	690	520	355
Surface Area—sq. cm./g..		11,900	12,700	15,300	16,000
Sheets A	Apparent density		14.0	15.8	17.0
	R_o		0.880	0.853	0.824
	S' x 10^4.....		364	303	248
	K' x 10^6.....		298	384	466
Sheets B	Apparent density	10.5	13.5	14.5	15.7
	R_o	0.886	0.882	0.851	0.835
	S' x 10^4.....	537	348	298	249
	K' x 10^6.....	394	275	389	406

It is seen from the above data that substantial decreases in S' occur with increased beating. The data show an initial decrease in K' in the first stages of beating, followed by an increase. The effect of the glazed surface in giving increased values of S' is rather surprising. The magnitude of this difference in S' is not large, but the same effect was noted to a greater extent in a preliminary experiment on unbeaten pulp. The sheets with a glazed surface had a higher density than the others and, therefore, it would be expected that they might have a lower S' value. That this difference may be due to lack of homogeneity in the sheet with the glazed surface is seen from the fact that it disappears with increased beating—the S' values for the two sheets at the 60-minute interval are nearly equal.

The results of an experiment on the effect of variation of pressing on optical properties are given in Table X.

The results for the sheets labelled B in Table IX are comparable with those of Table X because the sheets in both cases were prepared with a matte surface on both sides. The results in Table X show that increases in sheet density caused by increasing degrees of pressure affect the S' and K' values in the same way as do increases in sheet density caused by increased degrees of beating. The data show that sheets made from beaten pulp had lower S' values than did sheets made from unbeaten pulp pressed to the same apparent density.

TABLE X.—EFFECT OF VARIATIONS IN THE DEGREE OF WET PRESSING ON OPTICAL PROPERTIES
Bleached Spruce Sulphite
Wavelength—600 mμ

Pressure lb./sq. in.	Apparent density	R_∞	$S'x10^4$	$K'x10^6$
10	8.35	0.881	561	451
50	10.5	.886	537	394
200	13.0	.880	449	367
5000	14.9	.852	310	400

Evaluation of Area of Optical Contact of Fibers

From an optical point of view we can consider the total specific surface of the fibers in a paper sheet as made up of two fractions—viz., that portion of the area in optical contact and that not in optical contact. The latter contributes to the scattering coefficient; the former causes sensibly no light scattering and so contributes little or nothing to the scattering coefficient. Obviously, the fraction of the total fiber surface that is in optical contact in a paper sheet is closely related to the degree of bonding between the fibers. It is apparent, then, that a measurement of the area of optical contact of fibers would be of significance as a measure of the degree of bonding of fibers.

With the exception of the fines, the S' value of the different fractions of any one pulp is a linear function of the specific surface of the fibers. This offers a basis for the evaluation of the area of optical contact between fibers.

The first step in this evaluation is the formation of a paper sheet in which there is no fiber bonding and presumably none of the fiber area in optical contact. Then the total specific surface of the fibers contributes to their S' values.

Such a sheet was formed in *n*-butyl alcohol. This alcohol has been shown by Kress and Bialkowsky *(15)* to have practically no swelling action on cellulose fibers and presumbly there would be no fiber-to-fiber bonding in a sheet formed from pulp fibers in this medium. The spruce sulphite pulp was broken up in water in the British disintegrator. The pulp was treated several times with acetone to remove as much water as possible. It was then treated repeatedly with butyl alcohol and finally allowed to stand overnight in the alcohol, after which it was pressed out and dispersed in fresh butyl alcohol. The sheets were formed on a piece of wire from a British sheet mold cut to fit a 6-inch Büchner funnel. It was possible to obtain a fiber mat that would hold together well enough to be couched off onto a filter pad. The formation was very poor, however, and a quantity of sheets had to be prepared in order to obtain enough reflectance measurements to permit an accurate evaluation of SX. The sheets were pressed at 50 p.s.i. pressure for 7 minutes with a filter pad in contact with each side of the sheet.

The curve showing the relation between the S' value and the surface area of fractions of the spruce sulphite is a straight line which does not pass through the origin. The results for some of the other pulps —the poplar sulphite pulp in particular—indicate that, if all fractions of a pulp had the same density, this curve should pass through the origin.

The S' value of the sulphite pulp under the conditions of no fiber bonding was 750×10^{-4} at 600 mμ

wavelength, and its specific surface was 11,900 sq. cm./g. This area measurement was made on a sample from pulp that had been formed into a sheet on the sheet mold to allow for the loss of fine material through the wire. These values give one point on a curve of S' against specific surface. From the above reasoning this curve should pass through the origin. A straight line was therefore drawn from this point to the origin and this curve (Fig. 3) was used in evaluating area of optical contact. Taking the value of S' for the zero interval from Table IX, which is found to be 537×10^{-4}, a value of the area contributing to this S' value can be read off the curve; this is 8500 sq. cm./g. The actual area of the pulp as measured is 11,900. The difference between these two or 3400 is, therefore, the area in optical contact. This evaluation was carried out for the samples used in the beating experiment and also for the samples subjected to different degrees of wet pressing. The values obtained are given in Table XI.

TABLE XI.—EFFECT OF BEATING ON AREA OF PULP IN OPTICAL CONTACT

Sample	$S' \times 10^4$	Area contributing to S' from Fig. 3 sq. cm./g.	Measured specified surface sq. cm./g.	Area in optical contact sq. cm./g.	Percentage of area in contact
Beater Samples					
0-interval	537	8500	11,900	3400	29
15 min.....	348	5600	12,700	7100	56
30 min.....	298	4800	15,300	10,500	69
60 min.....	249	4000	16,000	12,000	75
Sulphite Pulp					
Pressure lb./sq. in.					
10	561	9000	11,900	2900	24
50	537	8700	11,900	3200	27
200	449	7200	11,900	4700	40
5000	310	5000	11,900	6900	58

The above data clearly show the large increase in the degree of bonding for a beaten pulp.

This method for the measurement of the area of optical contact of fibers is subject to criticism because of the assumptions made in the determination. However, it has the possibility of being developed into a method of measuring the relative bonding areas of pulps which could be of considerable value.

Relation Between Tensile Strength and Area of Fibers in Optical Contact

Tensile tests were run on the Schopper tensile tester for some of the handsheets prepared in the experiments on the effects of beating and pressure variations on optical properties; the data are given in

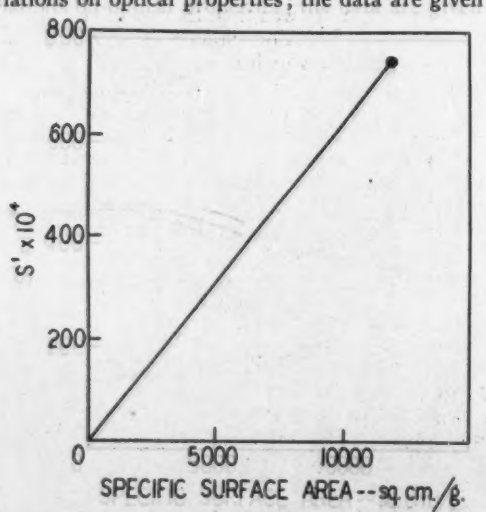

Fig. 3

Variation of S' with specific surface with no fiber bonding in sheet

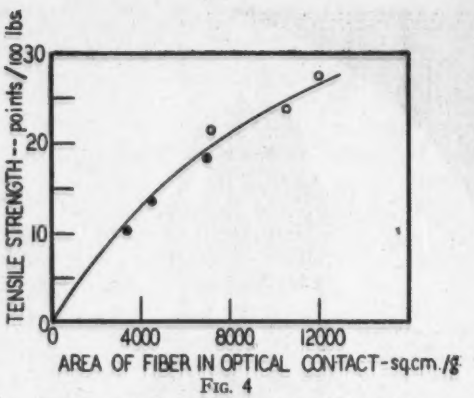

Fig. 4

Tensile strength versus area of optical contact

Table XII. Of particular interest is the comparison of the tensile strength of the beaten pulp samples with the calculated values for area of optical contact as obtained from Table XI. The value for tensile strength in points per 100 pounds was obtained by dividing the tensile strength in pounds per sheet by the basis weight and multiplying by 100. In Fig. 4 the tensile strengths of the sulphite pulp at various intervals of beating and at various pressing pressures are plotted against the calculated values of the area in optical contact for these samples. The values of the sheets from unbeaten sulphite pulp pressed at 200 and 5000 p.s.i. fall approximately on a common curve with those of the beaten pulp. This indicates that the relation between tensile strength and area of optical contact is the same, whether the strength variations are obtained by beating the pulp or by varying the degree of wet pressing of the sheets.

The shape of the curve in Fig. 4 indicates a linear relationship between the area of optical contact of the fibers and the tensile strength during the early stage of beating. This is followed by a levelling off of the curve which is presumably due to a decreased fiber strength occasioned by beating. This decreased fiber strength would partially offset increases in strength caused by increase in the area of optical contact.

TABLE XII.—TENSILE STRENGTH OF HANDSHEETS

Pressure lb./sq. in.	Tensile strength, lb.	Basis wt., 25x40—500	Tensile strength points/ 100 lb.
Sheets from unbeaten sulphite pulp			
50	5.1	49.4	10.3
200	6.7	48.6	13.8
5000	8.7	46.7	18.6
Beaten pulp samples			
Zero interval	5.1	49.4	10.3
15 min.	10.2	46.3	21.5
30 min.	10.9	45.7	23.8
60 min.	12.6	45.7	27.6

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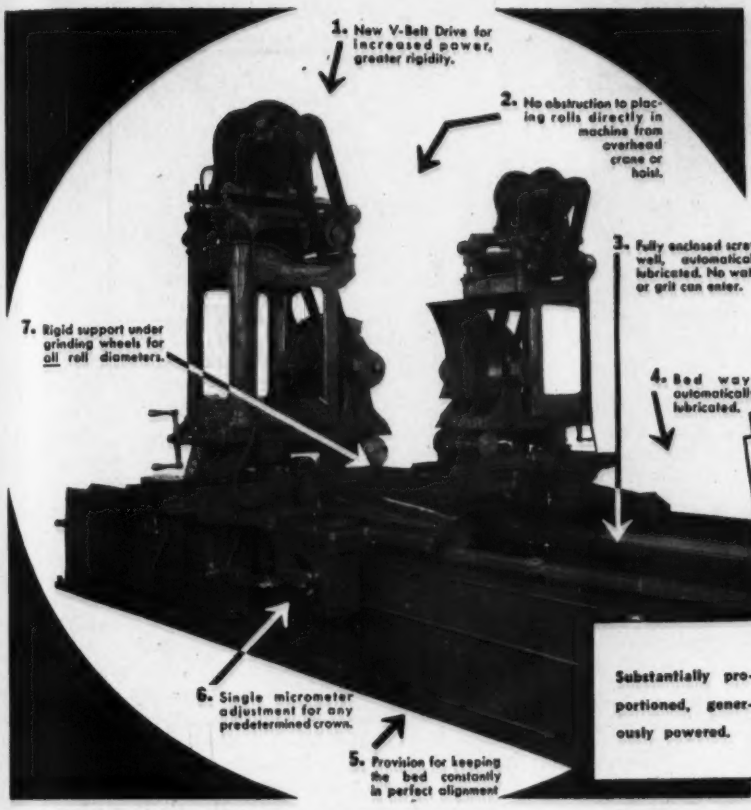
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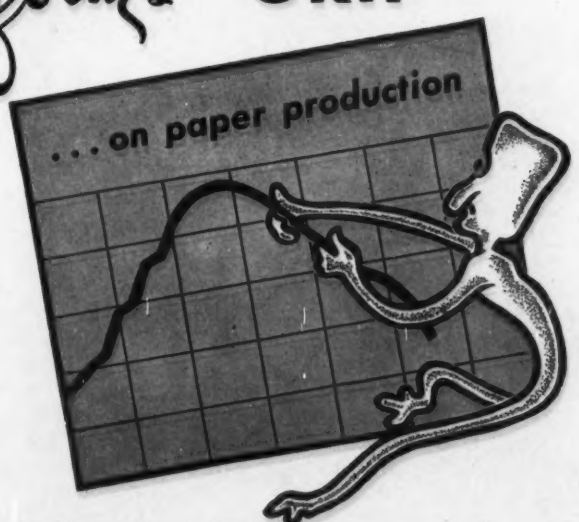

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Women War Workers No Problem

In a talk presented at the Annual Meeting of the New York State Federation of Women's Clubs held at Syracuse on November 10, Miss Lucy Ogden Norton, Assistant Supervisor of Personnel at the Erie Works of the General Electric Company, outlined the problems which industry faces in replacing men with women.

Miss Norton said at the outset that, while there are certain problems to overcome, they are not insurmountable.

"I disagree with any industrial executive who feels that the introduction of women introduces some mysterious or evil element into the factory situation. Women have been in all situations since the beginning of time. I think *only Adam* got there first. A new woman employee is not very different from a new man employee and we actually have no momentous obstacles to overcome," Miss Norton stated.

Pointing to the rising tide of women workers, Miss Norton said:

"There are now 14,300,000 women gainfully employed in the United States. By the close of 1943 this will be well over 18,000,000. This may mean that more than 40 per cent of the working population will be women, and this during the first two years of the war. This is a tremendous increase since the percentage of women in most industries prior to the war was below 19 per cent and in some industries almost nil."

As Miss Norton outlined them, the six problems with which industry must concern iteslf if women are to take the place of men are:

1. First, we must establish a fair rate of pay for a woman performing a man's job.

"There has been much publicity given 'equal pay for equal work.' If a woman is required to do the same work as a man, operate the same machines which men operate, and if this work will again be done by men after the war, then this is considered 'Man's work' and the woman should receive the same rate of pay as a man.

"2. Secondly, we must determine the types of work on which we can successfully employ women.

"This must be done through a detailed survey by trained engineers, personnel counsellors, wage payment technicians and safety consultants.

"3. Thirdly, we must establish a satisfactory schedule of working hours.

"In most cases this will be determined by state law. In December, 1941, most states relaxed their regulations concerning women to some degree. It is generally believed that a 6-day, 48-hour week is best. Pennsylvania relaxed its Woman's Law from a 44-hour limit to this 48-hour, 6-day basis soon after Pearl Harbor. Also, women may work on all shifts around the clock.

"4. Fourth, we must set up good health and safety standards for women.

"Here, the setting up of good, sanitary restroom facilities and cafeteria service is of great importance. Safety regulations with reference to women's clothing is essential and the standardization of uniforms appears in the offing although it is always difficult to dictate style to the fairer sex.

"5. Fifth, we must develop a simplified training program for women.

"The statement that 'women have no mechanical ability' would be more correct if worded 'women have no mechanical familiarity.' In the past, most mechanical training has been closed to us.

"6. Finally, we must look to the community for adequate care of dependent children of employed mothers.

"There is definite need for this care already in the case of mothers working on the second and third shifts. The answer to this general problem will probably be local nurseries run by the city or separate nurseries set up by individual plants."

Manhattan Rubber Lead Scrap Drive

Scrap totaling 1,023,327 pounds, or nearly one-sixth of the total amount collected by all of the plants in the busy Passaic, N. J., industrial area, was turned in by The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., during the first six months of the WPB industrial scrap drive.

Collections at Manhattan were reported as including: cast iron and steel (including borings, trimmings and sheet metal) 923,238 pounds, brass 12,315 pounds, lead 2,000 pounds, copper 1,117 pounds, aluminum 2,403 pounds, burlap 7,255 pounds, rags 44,165 pounds and paper 30,780 pounds.

The drive also focused attention on machinery and equipment that was being used infrequently because of changes in products and processes, and what could be spared was sold to other local shops having important war sub-contracts, in the execution of which this equipment could be used.

Several interesting items of scrap were uncovered in the Brighton Mill Annex, recently acquired by Manhattan. These included a 4,100 pound steel boom used by the old Fokker Aircraft Company for lowering aeroplane wings from the third floor of one of the buildings and 2,000 pounds of lead plate used in a drying room. In these instances, as well as many others, the cost to remove the obsolete equipment was more than the salvage value, but no attention was paid to this cost in the effort to make every possible contribution to the Nation's scrap pile.

According to company officials, while tremendous progress have been made, the scrap drive is a job that is never finished. The entire Manhattan supervisory staff and all employees are on the alert, and while the quantity is decreasing, neverthless additional scrap is being found every day.

Wallace & Tiernan to Build Lab

The Wallace & Tiernan Company, 11 Mill street, Belleville, N. J., manufacturer of chemical feed equipment, chlorine control apparatus, etc., for paper mill and other service, has approved plans for new one-story brick laboratory at plant, for which work will begin at once. Erection contract has been awarded to the Mahony-Troast Company, Passaic, N. J.

Rice Paper Co. Made Brown Agent

The C. M. Rice Paper Company of Portland, Maine, has been appointed an agent for L. L. Brown's Linen and Linen Typewriter papers, products of the L. L. Brown Paper Company, Adams, Mass. These papers, which are made from 100% new, white linen and cotton cuttings, are being stocked by the new distributor in substances 9, 11 and 16, white wove, plain and ruled.

ELIXMAN

CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.

CORINTH, N. Y.

New York Paper and Pulp Market Review

Demand For Leading Grades of Paper Reported at High Level With Sales Under Recent High Point—Pulp Market Rather Quiet —Lower Grades of Waste Paper More Active at High Prices.

Office of the PAPER TRADE JOURNAL.
Wednesday, December 16, 1942.

Demand for the leading types of paper continues to be reported rising above the current supply. Reports from some of the many manufacturers' representatives, jobbers, and general paper merchants this week, indicate that the current level of sales is under the recent high point.

The index of general business activity for the week ended December 5, declined to 133.7%, from 136.7% for the preceding week, compared with 133.8% for the corresponding week last year. Paper board production was 5.5% lower.

Paper production for the week ended December 5 was estimated at 84.9%, compared with 106.9% for 1941, with 85.2% for 1940, with 97.3% for 1939, and with 77.6% for the corresponding week for 1938.

Paper board production for the week ended December 5 was 82.0%, compared with 102.0% for 1941, with 78.0% for 1940, with 79.0% for 1939, and with 64.0% for the corresponding week for 1938.

Newsprint production will almost certainly be reduced for next year, both in the United States and in Canada. In some quarters, the initial cut of the domestic output is estimated at about 15% in the 1942 production. No definite information or actual figure appeared, however, in the supply reduction formula presented by the Newspaper Industry Advisory Committee, when it met with officials of the War Production Board on December 10.

Pulpwood

A preliminary estimate of the pulpwood supply, according to William G. Chandler, Chief, Printing and Publishing Division, War Production Board, gives the available supply for 1943 at some 20,000,000 cords compared to current consumption of 25,000,000 cords. The supply situation, however, is more favorable than these figures indicate, as stocks on hand are quite generally reported at an excellent level. In some quarters, the pulpwood supply situation is regarded at this date as adequate, but manpower diversion from pulpwood to lumber, is expected to reduce the pulpwood cut next year by a very substantial extent.

Wood Pulp

No important change in the chemical wood pulp market has been reported at this date. Prime grades of bleached sulphite are scarce. Adequate supplies of other grades of sulphite and sulphate pulps are reported available.

Rags

Demand for new cotton papermaking rags continues steady. Prices are firm, with no important changes reported this week. Demand for mixed rags continues good.

Old Rope and Bagging

Mill buying of old No. 1 Manila rope is reported steady at the OPA price of $115 per ton. No important change has been reported in other grades of cordage or twine.

Trading in scrap bagging is on a very limited scale. Volume is so small that prices are of a nominal nature.

Old Waste Paper

Continued increasing demand for the lower grades of waste paper has resulted in firmer and higher prices on No. 1 mixed, currently quoted at .25 per cwt. and on folded news, at from .50 to .55 per cwt.

Twine

Demand for major grades of twine is currently reported at a moderately high level. Prices are firm, with no important changes occurring during the current week.

Two Pen Flow Recorders

Where panel space is at a premium, or where it is desired to have two related flow records on the same chart for ready comparison, the new 2-pen Cochrane electric flow meter (actually two complete Cochrane flow meter receivers mounted within one double depth case) achieves the result without complication and with no loss of accessibility. Both receiver mechanisms can be swung out and operate in the swung-out position. The connection between the rear receiving mechanism and its pen arm must necessarily be detachable and is arranged with a self-aligning V-notch junction.

Where two related measurements are involved, the operator has often sufficient guidance by observing the coincidence (or lack of it) of the two pens. However this does require that he note which pen is which. For cases where continual reference must be made to this relationship of the two records, ratio indicating pointer can be incorporated. The clearly visible red target moves to right or left from the center point on the scale and thus shows at a glance whether there is an excess or deficiency of one of the quantities with respect to the other. The pointer movement moreover is two and one-half times greater than the difference between the two recording pens and is thus much more readily noted.

Integrating feature can be furnished on both mechanisms but reading of rear mechanism integrator requires opening case and swinging front mechanism forward.

THE ANSWER IS IN KALAMAZOO

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Do you want to know How and Where to secure paper mill tanks that cost less, give better and cleaner service — and last longer? The answer is in Kalamazoo!

Manufacturers of wood tanks for 60 years.

KALAMAZOO TANK & SILO CO.

KALAMAZOO MICHIGAN

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EXCELSIOR KNOX Woolen Co. Camden, Me. FELTS & JACKETS

BUT also a guarantee by men who for 78 years have prided themselves in making finer felts. TO YOU —this is the mark of dependability, longer felt life and greater saving.

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CAMDEN, MAINE

War jobs helped by HOOKER CHEMICALS

KEEPING THE PRESSES ROLLING

In any list of equipment for war, the printing press deserves a high place, and paper is the ammunition that makes the press effective. Supplying that paper is no easy work in times like these—added reason for relying on

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for caustic soda and other chemicals for the pulp and paper field. HOOKER reputation for quality and uniformity is being zealously guarded even under the present tremendous pressure for quantity. Now as ever, HOOKER specialists are available to help solve any problems relating to chemicals within the scope of HOOKER production.

3230

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, December 16, 1942.

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. The pulp is currently quoted at $40 per ton in barrels, at works; the powder is offered at $60 per ton, f.o.b., works. Demand reported fair for the week.

BLEACHING POWDER—Prices on bleaching powder are firm. Current demand reported active. Bleaching powder is currently quoted at $2.50 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein are unchanged for the week. Standard domestic casein, 20-30 mesh, is quoted at 19 cents per pound; 80-100 mesh at 19½ cents per pound; all prices in bags, car lots. Argentine casein, 20-30 mesh, at 7 cents per pound, c.i.f., is reported nominal. No quotations on French casein.

CAUSTIC SODA—Prices on caustic soda are reported unchanged. Supplies ample. Demand fair for the current week. Solid caustic soda is currently quoted at $2.30 per 100 pounds, flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged. Demand reported fair for the current week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine unchanged. Government demand for war use continues heavy. Chlorine is currently quoted at from $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosins are lower for the current week. "G" gum rosin is currently quoted at $3.42 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $3.42 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $3.63 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand reported moderate for the current week. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point. Quotations on imported salt cake are nominal at $16 per ton.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand good. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch continue unchanged for the current week. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds; all prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported light. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at from $1.75 to $1.85 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices of sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $16 to $21 per ton, at mills. No quotations on imported talc.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	$5.00	@	—
No. 1 Wrapping	4.75	"	—
Standard Wrapping	4.50	"	—
Standard Bag	4.125	"	—
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.05	"	—
White No. 1½	1.00	"	—
White No. 2	1.00	"	—
Anti-Tarnish M. G.	.95	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case			
Unbleached, Jr.	2.35	"	—
Bleached, Jr.	2.65	"	—
Manila—per cwt.—C. l. t. s			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	5.50	"	5.75
No. 2 Manila Wrapping, 35 lb.	5.25	"	5.50
Boards, per ton—			
News	*48.00	@	—
Chip	*45.00	"	—
Srl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*60.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
100% Rag Ext. No. 1	$39 10 @ $46.00		$40.25 @ $47.25
100% Rag	32.20 " 37.75		33.35 " 39.25
85% Rag	.... "		29.90 " 35.00
75% Rag	23.00 " 27.00		24.15 " 28.25
65% Rag	.... "		22.80 " 27.75
50% Rag	18.70 " 22.75		19.90 " 24.25
25% Rag	16.40 " 20.00		17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds		Ledgers
No. 1	$10.55 @ $12.75		$11.70 @ $14.25
No. 2	9.65 " 11.75		10.80 " 13.25
No. 3	9.20 " 11.25		10.35 " 12.50
No. 4	8.90 " 10.75		10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper

Delivered in Zone 1

No. 1 Glossy Coated	$13.65	@	$13.9
No. 2 Glossy Coated	12.40	"	14.0
No. 3 Glossy Coated	11.60	"	13.2
No. 4 Glossy Coated	11.15	"	13.7
No. 1 Antique (watermarked)	10.25	"	11.7
No. 2 Offset	9.60	"	11.0
A Grade E. F.	9.35	"	10.7
A Grade S. & S. C.	9.60	"	11.0
B Grade E. F.	8.85	"	10.2
B Grade S. & S. C.	9.10	"	10.5
C Grade E. F.	8.55	"	9.7
C Grade S. & S. C.	8.80	"	10.0
D Grade E. F.	8.25	"	9.5
D Grade S. & S. C.	8.50	"	9.7

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight to Destination.

Bl. Softwood Sulphite	$76.0
Unbl. Softwood Sulphite	64.00 @ 66.0
Bl. Hardwood Sulphite	73.5
Unbl. Hardwood Sulphite	63.5
Bl. Mitscherlich	81.0
Unbl. Mitscherlich	72.0
N. Bleached Sulphate	86.0
S. Bleached Sulphate	79.0
N. Semi-Bleached Sulphate	82.0
S. Semi-Bleached Sulphate	75.0
N. Unbl. Sulphate	73.0
S. Unbl. Sulphate	63.5
Bl. Soda	66.0
Unbl. Soda	62.0
Groundwood	46.0

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	8.00	@	8.25
Silesias No. 1.	4.50	"	4.75
New Unbleached	8.00	"	8.25
Blue Overall	5.75	"	6.00
Fancy	3.00	"	3.25
Washables	2.50	"	2.75
Mixed Khaki Cuttings	2.50	"	2.75
O. D. Khaki Cuttings	3.00	"	3.15

ENGLISH ECCO CLAYS

ECCO CLAYS — TRADE MARK

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Buffalo, New York

HUBBS & HASTINGS PAPER COMPANY
Rochester, New York

CHARLES F. HUBBS & COMPANY
Bridgeport, Conn.

INTERSTATE CORDAGE & PAPER COMPANY
Pittsburgh, Pa.

THOMAS J. NAGLE PAPER CORPORATION
Hollis, New York

HUBBS & HOWE COMPANY
Cleveland, Ohio

HOLLAND PAPER COMPANY
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CHARLES F. HUBBS & COMPANY
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Montreal, Quebec, Canada

VICTORIA PAPER & TWINE COMPANY LIMITED
Halifax, Nova Scotia, Canada

GARDEN CITY PAPER MILLS COMPANY LIMITED
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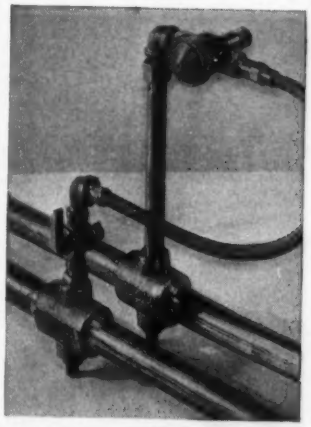
THIS HUMIDIFYING SYSTEM SAVES THREE WAYS---



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because it maintains uniform moisture content of stock in cutting, sorting, and storage rooms, under a wide range of conditions. Precision built spray heads produce a uniform, finely atomized spray, completely absorbed by the atmosphere.

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Write for Bulletin HE-100

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ROLLS

Mean
STRONGER LONGER LIFE
due to patented features
Write for Catalog!
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63 Mill St. Orange, Mass.

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Thirds and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All prices nominal

New Rags			
New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25
Old Rags			
No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.00	@	4.25
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	4.75
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	4.25	"	4.75
Sisal Strings	3.25	"	3.75
Mixed Strings	1.10	"	1.20

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old Kraft Corrugated Containers	1.50	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	—	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07½	@	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07½	"	.07½
Washable Prints	.03¾	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¾
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03¼
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¼	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed Rope	.75	"	1.00
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Ledger, colored	1.87½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Box Board Cuttings	.72½	"	—
Jute Corrugated Cuttings	.90	"	—
Overissue News	.85	"	—
No. 1 News	1.00	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old Corrugated Containers	1.00	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	3.50	@	4.00
Sisal Rope	4.50	"	4.75
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.75	"	5.25
Jute Carpet Threads	3.25	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.50	"	3.75
Scrap Sisal	4.50	"	4.75
Scrap Sisal for Shredding	—	"	.04¾
Wool Tares—			
Foreign	(nominal)		
Domestic	5.00	"	5.75
Aust. Wool Pouches	5.10	"	5.25
New Burlap Cuttings	5.00	"	5.25
Heavy Baling Bagging	4.25	"	4.75
Paper Mill Bagging	2.75	"	3.00
No. 2 Bagging	1.35	"	—

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¼	"	.05
New White No. 1	.06¾	"	.06¾
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¾
Underwear Cutters, Bleached	.06	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¾
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	—
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¼	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—*
Miscellaneous	3.20	"	—*
White No. 2—			
Miscellaneous	2.65	"	—*
Twos and Blues, Repacked	2.20	"	—*
Old Blue Overalls	2.25	"	2.3[illegible]
Thirds and Blues, Repacked	2.20	"	—*
Miscellaneous	1.80	"	—*
Black Stockings	3.50	"	4.0[illegible]
Roofing Stock—			
No. 1	1.55	"	—*
No. 2	1.45	"	—*
No. 3	1.35	"	—*
No. 4	1.35	"	—*
No. 5, Quality A	1.35	"	—*
Quality B	1.20	"	—*
Quality C	.95	"	—*
Old Manila Rope	5.75	"	—

* OPA Maximum Prices

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nomina[illegible]
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.50	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	75	"	—
No. 1 Mixed Paper	70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bars	1.45	"	—